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D. K. MINOR, Proprietor.] FOR DECEMBER, 1834. [SAMUEL FLEET, Editor.

ORIGINAL COMMUNICATIONS.

Planting Ornamental and Forest Trees. By E. Sayres. [For the New-York Farmer and Amerian Gardener's Magazine.]

The disposition of cutting down *Forest trees* has, of late years, prevailed to a great extent in many parts of the United States; and, indeed, in some cases perhaps rather injudiciously, as whole districts, in the New-England states particularly, are to be seen without a solitary *tree* or *shrub:* concerning the impropriety of such mutilations, I leave to the intelligent reader to judge. For my own part, I feel rather diffident in giving my opinion too freely on such a subject; but would suggest that, were a portion of trees to be standing, as mere objects for shelter and shade, it would be of general utility, in a country like this, where the heat is so excessive; and in protecting dwellings and offices, attached thereto, which, in all cases, is considered as beneficial and giving good effect. In parks and extensive lawns they are always needed, to harmonize with the mansion, and appendages thereto; as lodges and entrances into such establishments, they are equally requisite.

But, in order to plant the above situations, it will be recollected that the manner and the varieties to be used, for such purposes, are entirely different. In the operation of planting ornamental trees, there are many kinds to be used; where plantations are intended for useful purposes, such as filling up vacancies not capable of culture, different varieties of forest trees must be employed that are useful in buildings—as the oak, the elm, the maple, locust, and all kinds of native forest trees that are useful as *timber*. This planting may be applied on the outskirts of woods, coppices, and such woodlands where their places require to be filled up, in order that every part may be regularly covered; in such cases the only expense is the first cost of planting, which is but trifling to the value that would accrue in the space of 20 or 30 years. The time and manner of planting is the same as other hardy trees, and will require no notice in this place.

Planting, to protect buildings and their appendages, may be considered both ornamental and useful, giving additional value to property. Where houses, of any description, are located by highways, their appearance is always more engaging when they are accompanied by groves of trees, as the pine, the maple, the elm, chestnut, and the like, which, when judiciously planted, give consequence to the buildings. The method of planting is of so simple a nature that it may be performed by any intelligent person. In the first case, if a mansion is to be ornamented, the right and left wings should be planted with trees of the lowest growth, the arbor vitæ, the maple, and the like; which should be flanked and backed with trees of larger growth, as the oak, the chestnut, elm, and the like. The front of the house in such cases is generally clear to the view of the traveller, with an exception where large lawns or parks are attached thereto; in which case, clumps of trees may be planted at a convenient distance, to give effect; and those of an ornamental character dispersed in different parts of the ground, as the lime, the horse-chestnut, catalpa, and the like.

In *park planting* the trees adapted are in most cases considered such as are of an ornamental character; the principal object being a stately and corresponding appearance, to harmonize with the mansion. Their disposal should be such as to give a pleasing effect, and add as much as possible to the extent of the domain.

Transplanting Large Trees.

Where hasty improvements are desired in the ornamental department, as the forming of groups of trees, covering buildings, or the like, it may be greatly facilitated by transplanting large trees, from 16 to 18 years old. This process has been very successfully followed for some years at Hyde Park, and owes its origin there to a French gentleman, who formerly had the superintendence of that department. Mr. Hobbs, the present manager of this department, informs me that the process is attended with general success; and the fine groups of trees there to be seen, planted by this method, fully demonstrate the practicability with which it may be performed. I recommend this as a cheap and expeditious method of obtaining the desired effect, in a short time, of forming groups of trees, protecting and concealing buildings, both for convenience and protection from the north-west and other winds; and trust that ere long it will be generally and effectually practised in every section of this country.

The trees generally operated upon are from 14 to 18 feet high, and some from 20 to 22; but the latter do not appear to do so well. The manner of performing is to dig out the soil round the tree, at a convenient distance, to the depth from 8 to 10 inches, forming a circle which may be from 4 to 6 feet in diameter, in proportion to the size of the tree; the depth should be such as to cut through the upper tier of roots, and an inch or two deeper. The tree is now to remain until the roots and ball are frozen nearly through, when it is to be lifted up by means of crowbars and levers; the operation is performed by first cutting under the ball, all round, with a spade, pick, or other tool, when the crow-bar and levers are applied to one side, which is lifted up, and part of the ball reduced underneath; this done, a piece of wood is put under the side or the centre of the ball, and the other side is then to be managed in the same manner. When the ball of earth is properly reduced, its form resembles a mill stone, and is about the same proportion, circumference, and thickness. By this method, all the under fibres of the tree are drawn up, and the upper tier of roots are kept entire with the ball; when this is performed, it is left to remain a day or two, when it is removed to its place of destination, either on a sleigh or other convenience, and planted in a hole prepared in the usual manner.

This method is particularly applicable to the *pine tribe*, and, indeed, to all evergreens, which are generally much injured in removal in the ordinary way, when they are large trees, their roots being laid bare, which is always injurious to the pine tribe.

The great advantage in this system is, that it can be performed in a season when scarcely any thing can be done in the Horticultural department. A great advantage is to be gained by marking the places in the fall intended to be planted, and covering them with leaves or long manure, which will keep out the frost and make the labor of digging the holes less troublesome. The holes, in this method of planting, should be dug but a short time prior to planting, or the fine earth will be frozen in a mass, and consequently will not close to the ball properly. It is a good method to bring the tree with the frozen ball to the intended place before the hole is dug, and to put it into the hole by means of levers as soon as it is ready, when the earth will adhere to it more freely.

Edward Sayres.

Nov. 24, 1834.

Remarks—The above is extracted from a work which Mr. Sayres is now preparing for the press.—[Ed. N. Y. F.]

Culture and Manufacture of Indigo. By H. Perrine, Esq., U. S. Consul at Campeche. [For the New-York Farmer and American Gardener's Magazine.]

Mr. Fleet: Sir—Observing in your June number that Mr. Seely, of Onondaga, says—"My children would be pleased with the history of the culture and manufacture of indigo," I send them some notices which you may *not* find in Morse's Universal Geography, to which he refers, and which may also please *my* children, not very distant from *his*, on the Grand Canal.

Like our Amorpha fruticosa, or bastard indigo, which was once used in Carolina as a substitute, and may be profitably tried again with the Baptisia tinctoria, or wild indigo, which also flourishes in our poorest soils, there are spontaneous species of the indigo fera, or true indigo, growing in all parts of tropical America, including the tropical portion of our own peninsula of Florida. The indigo of trade is obtained from at least four distinct species, viz.: the indigo tinctoria, indigo anil, indigo argentea, and indigo disperma. But the indigenous indigo plants of Yucatan, like the indigenous substitutes of the United States, are rather *collected* than cultivated, and then undergo the troublesome, offensive, and unhealthy

processes of fermentation, separation, and evaporation, described in the books. It is said that the first seeds of the indigo tinctoria, sown in our country, were received by Mrs. Pinckney, of Carolina, from her father, the Governor of Antigua. "She planted some of them in March, 1742; the indigo was cut down by the frost. She planted others again in April, and they were also lost. She tried the third time, and, being finally successful, she distributed the seed. Hence the culture became common, and in a few years it was an article of export, being at one time the second staple produce of South Carolina." Blessings on her patriotic perseverance! Had we but one Mrs. Pinckney for every State in the Union, we should have naturalized all the other valuable tropical plants in the world!! The spontaneous growth and long tap root of *the* Indigo fera tinctoria, in the most arid savannas and rocky plains, shows that it will thrive in what are *called* our most *sterile* soils. It is well enough to caution our children, and even some parents, against the *abuse* of the *relative* terms, sterility and fertility. As nearly all our *present* great staples are delicate plants, which require soils greatly charged with organic remains, and soon exhaust the richest vegetable mould in which they continue to be cultivated, the ideas associated with their history are transferred to the cultivation of all other vegetables. To this cause may be probably attributed the repeated failures of patriotic enterprize in endeavoring to cultivate exotic vines. In the excellent article on vineyards, by A. J. Downing, at page 132 of your May number, I perceive that 20,000 plants of the Italian grape vine, transferred to Louisiana, had nearly all perished, except a few which were planted in the city of New-Orleans, in the *rubbish of old brick houses*. Hence, I repeat again, let our reformed Agriculture seek plants adapted to its natural climates and soils, instead of endeavoring to adapt its soil and climate to any plant. The gradual adaptation of any plant to every climate is entirely a separate question. But of this, more anon. From what has been said, even children will infer that the cultivation of indigo is a very simple process indeed.

When they begin to learn how *very* indolent and ignorant are the colored natives of the torrid zone, they will not be surprized at the rudeness of their methods of propagating plants, for cultivation, *as we understand it*, does not exist among such people; and hence, even children will conceive the great importance of introducing into the United States all such tropical plants as will flourish in any soil and situation without scarcely any care of cultivation, and are, moreover, capable of self-propagation.

They can easily understand the best cultivation of indigo, which they should understand is a leguminous plant, by a reference to the cultivation of the other leguminous plants, well known to them by the names of lucerne and of clover. When taught that most leguminous plants delight in a dry soil and climate, and warm temperature, and have learned the best methods of cultivating clover to obtain the greatest quantity of pasturage, or hay, with the least labor and capital, they can apply the same knowledge to the cultivation of indigo, with the view of obtaining the greatest quantity at the least price.

Supposing the field to be properly prepared for the reception of the seed, the question then may occur, which is the appropriate species for the soil and climate in which it is to grow. By Eaton's Manual of Botany, it appears that the indigo tinctoria is the only exotic species cultivated in our confederation.

The leaves of this species, which somewhat resemble those of lucerne, are *said* to contain more coloring matter than those of any other species; but although it is more abundantly cultivated in both the Indies, yet American children should be taught to *make a trial of* ALL, in order to ascertain which is best, all things considered, for the soil and situation of their respective farms. Now, the indigo argentea, or *shining seed* indigo plant, grows five or six feet high, or double the height of the former in equal soils; *is much more hardy* in sustaining the changes of season *and soil*, and in resisting the attacks of insects, and the effects of heavy rains. Hence it is cultivated in Egypt and Barbary, although it is *said* that the manufacture is more difficult, and the grain of the fecula not so large.

The indigo anil resembles so much the indigo argentea, that it is scarcely possible to distinguish them, except by the *shape* of their leguminous *pods*, and by the *color* of its *seed*, which are *reddish brown*, instead of *shining black*.

This species usually furnishes the fine indigo of Guatemala, of which it is a native, but it is now cultivated in the East Indies also; and although it is *said* that it produces less dye than the indigo tinctoria, yet it is admitted that the dye is of finer quality. I have no special intelligence of the peculiar properties of the indigo disperma. The indigo cerulea, discovered by Dr. Roxburgh, growing wild as high as two feet on barren, uncultivated ground, appears to merit cultivation, not only on account of its adaptation to the poorest natural soils, but also for the light and more beautiful indigo which has been obtained from it, in greater quantity than from the same weight of the common plant. As 8 lbs. of the leaves are *reported* to yield 241 grains of pure indigo, or upwards of 6 per cent., the experiments merit at least the trouble of repetition in our own country. But as there are at least 70 species of indigo fera known to botanists, is it not to be regretted that agriculturists have been hitherto contented with the cultivation of only four species, or not one-seventeenth of the whole number?

But I find I am spinning out this communication too long for children, as my object is not to task their recollection by tedious details, but to stimulate their inquiries by associated suggestions. With the same motive, I wish to call their attention to the gradual acclimation of plants—to the travelling of the potato from Peru to Canada—of tobacco from Yucatan through Virginia to Ohio—of the sweet potato through the Carolinas to New Jersey—of cotton, now cultivated in Illinois, and of other *tropical* plants, whose present extreme limits to the North they know perhaps better than I, after a residence of seven years in the torrid zone. Hence they may be induced to *try* the cultivation of the indigo tinctoria, along the great canal and the great Ontario; and if that fails, to *try* the indigo argentea, &c., remembering always the perseverance of Mrs. Pinckney. Like our Indian corn, which has *learned* to grow faster in Canada, so may also many *other* tropical plants be *taught* to grow quickly in the state of New-York. But even in case of constant failures of seeds or plants, direct from the tropics, they must not be disheartened, but recollect that, by gradual travelling from Southern Florida, through a single state, every year, they will finally enjoy them all in their maturer years. In the mean time, they can also try the effects of cultivation on the indigenous substitutes of their own and analogous wintry climates, for which purpose I annex a list of the substitutes for indigo, which the libraries of your city will enable you to augment. But, to return to the manufacture of indigo. I have said before that the common methods are costly and troublesome, and offensive and unhealthy; and, what is still more important, *are at present unprofitable*.

Now, one great motive of the present letter is to call public attention to the fact that a much better method exists—a method which is cheap, easy, inoffensive, and healthy, and, above all, *profitable* for the poorest people on the poorest soils. In one line, it is simply *the substitution of the infusion of the dried plant* for the fermentation of the green plant to obtain the resulting indigo. You know that the green leaves contain merely the elements of the dye, not the dye itself; that hence, neither the cold nor the hot infusion of the *green* leaves can extract a color which they do not contain, and that consequently fermentation must be superadded, to enable the elements of the blue color to combine with the oxygen of the atmosphere. Even boiling the *green* leaves, and evaporating the extract without fermentation, merely produces a yellow or greenish yellow matter. But if the indigo plant is cut when beginning to blossom, and then dried like clover, and stowed away like any kind of hay, the dried leaves will gradually change from a bright green to a light lead color, and finally become entirely black. Now, when these leaves acquire the color of lead is precisely the time when the poorest cultivator, who owns a hogshead, can fill it with leaves and water, stir them together till the water becomes thoroughly impregnated, which should not exceed two hours, and then drain off the *green* colored infusion into a tub, and there agitate it until the liquor gradually changes to a dark blue, or, at the most, two hours longer. Let it be then left to settle during two or three hours, pour the water off the sediment, and the sediment on a strainer, and the resulting light dry blue mass is *better* indigo than that obtained by fermentation.

As I am interrupted by a man connected with the Mexican schooner Perfecta, who says she will sail in a few minutes, I must conclude my suggestions, and trust my letters to these people, although it appears that not one in four, entrusted to Mexicans or Spaniards, have ever reached the United States. I will add, however, a few lines, to confirm my positions that we can better improve on the suggestions offered by the vegeculture of the torrid zone, than adopt the practice of its ignorant agriculturists and manufacturers. I therefore have stated in general terms, that very superior indigo can be obtained by simple infusion, agitation, precipitation, separation, and drying; and I now wish it to be remarked that, as the same hogshead can be refilled six or eight times in the working hours of our countrymen, a

single man, woman, or child, may thus extract, in the same time, six to eight pounds, at least, of pure indigo!! Now, Sir, can you tell me any reason why every farmer in our Northern States should not make his own indigo as well as his own soap? Can he not apply the same process of infusion to the dried leaves of our Amorpha racemosa, and Baptisia tinctoria? Would it not also be well enough that the *children* should moreover try to extract from these wild weeds of our worst soils at least an equivalent to woad? And if neither the hot nor the cold infusion should answer, why not treat their leaves as the leaves of the woad itself are treated, viz.: by grinding them to a paste, which is made into balls, and placed in heaps, until fermentation separates them into the coarse powder which constitutes this dye.

And, at all events, as the culture of the woad, and its *cousins*, turnips, is the same, why not have a patch of both on every farm adapted to either? But we are told also, that the balls of blue indigo, prepared for *use* in some parts of Africa, *are simply the leaves of the plant rolled up*—that, in Senegal, the leaves are *gathered* at *any time* of the year, and merely pounded in a mortar till reduced to a paste, which is made into leaves, dried, and thus preserved for use." Now, these processes are still more economical than the simplest above stated. Do not they merit at least the trouble of a single trial? It is said that the masses of leaves thus preserved are dissolved in an alkaline solution, and communicate to the immersed cloth a permanent blue color, much more brilliant than the cloth of European dye-houses, and which acquires, instead of losing, additional lustre by repeated washings? For reasons obvious to yourself, and which I have not time to detail, we can readily believe that thus used, in its natural forming state, it must impart a much richer and purer dye. But, more of this hereafter.

But to return to the simple infusion of the dried leaves, with which I begun. Professor Sagra, of the Botanical Garden of Havana, made various experiments on this subject, and sent the resulting specimens of indigo to Madrid. After analysis by the ablest chemists of the kingdom, and passing through the innumerable formalities of Spanish countries, it was considered a matter of so great importance as to merit the especial encouragement of His Most Catholic Majesty. His most royal thanks were therefore presented to Professor Sagra, with his most royal offer of a most royal premium for his past services, and a most royal stimulus for his future services. (By the bye, I wish our own government would manifest some royal recognition of my services.) He further ordered that the seeds should be sent from the garden of acclimation in Havana, to the garden of acclimation in the Canaries, and thence to the garden of acclimation at Seville. [See Royal Order to the Intendant of Havana, of 10th November, 1829.] What a royal example for our government to aid the acclimation of tropical plants!

Being again hurried, I subjoin the list of the names of the substitutes for indigo which at present occur to my recollection. Besides its leguminous brethren, our Amorpha racemosa, and Baptisia tinctoria, there is also named the Galega tinctoria. Under the hardy natural order of Apocyneæ, the shrubby, or tree-like, Nerium tinctorium, and Wrightia tinctoria; and under the kindred Asclepiadeæ, a species of Marsdenia; under Polyoneæ, three brothers of our buckwheat, the Polygonum tinctorium, P. chinense, and P. aviculare; under the Compositæ, the Spilanthes tinctoria; under the Irideæ of J. the Sisyrinchium tinctorium. The Anil de palo, or wood indigo, of Tobasco, with compound flowers, is so abundant as to serve also for fuel. The Anil de Cucuy, of that state, or the Titz, of Yucatan, has diandrous monogynous flowers, resembles a currant bush, and even its *green* leaves, infused in hot water, furnish, in a few minutes, a most beautiful substitute for indigo. A single bush, in the garden of every family of the United States, would render unnecessary the purchase of a single grain for domestic use. Not being sufficiently supplied with books of reference, I have hitherto been unable to determine the botanical name of either the shrub indigo of Tobasco, or the bush indigo of Yucatan, or whether indeed they are plants entirely unknown to the botanists; but as I have sent specimens of both to our modern Linnæus, Doctor Torrey, I hope you will call on him to ascertain whether he has received the specimens, and what he conceives to be the appropriate name of the plants from which they were taken.

H. Perrine.

Consulate U. S. A., Campeche, 2d October, 1834.

Climate and Productions of Florida. By A Traveller. [For the New-York Farmer.]

Mr. Fleet,—Having seen in the late numbers of your valuable journal communications from Dr. McKinney, and Dr. Perrine, relative to South Florida, and having noticed that these gentlemen confined themselves principally to Cape Florida and the Miami river, the writer would beg leave to state, that after having visited Cape Florida, the Miami, and New river, which lies a little north-east of the Miami, he decidedly prefers the latter. The river is much longer, the alluvions and hammock lands more extensive, and the soil more fertile; its waters are better, abounding in fine fish and excellent fowl; its climate is equally good, permitting perpetual verdure to the most delicate plants. The north fork is equally good, and possesses equal advantages with the other branches. Nor are the lands subject to the same inconvenience as those on the Miami: no engrossing Spanish claims occupy its fertile regions, and but few pre-emption settlements have yet been made. Some donations are almost the only lands legitimately occupied in that part of Florida.

New River bay is a beautiful sheet of water, when the tide rises; it is about 4 feet deep, abounds in fish, fowl, and oysters, and its delightful sloping and picturesque borders present a scene of fertility, beauty, and salubrity, rarely equalled in any country.

Dr. M. speaks with great confidence of the salubrity of Cape Florida; he is no doubt correct, but in the opinion of the writer the pine lands back of New River bay are equally salubrious, and, as these are the property of government, will afford greater facilities for individual enterprize than those on the Miami, which are held by a Spanish grant, and that claim contested by two individuals. This New River bay district would form a delightful winter retreat for invalids, and even the summer might be passed there with comfort, as the climate is equally temperate in summer and in winter.

It is to be hoped that Dr. Perrine may succeed in his project of a *Tropical Plant Nursery*, as there can be no doubt that many of the valuable tropical plants would succeed well, as some of them are actually being cultivated, and others are indigenous there. If the patronage of government be withheld, let the S. Florida lands be put in market, and individual enterprize will accomplish what has been in vain solicited from the government of the nation. A Traveller.

New-York, Oct. 24, 1834.

Mexican Productions—Terms of Emigration to Jicaltepec. By D***. [From the Quarterly Journal of Agriculture, Mechanics, and Manufactures.]

Plantation of Jicaltepec,
State of Vera Cruz, July 27, 1834.

My Dear Sir,—According to promise, I will send you for the present a few hasty particulars concerning this place, reserving a more minute detail for my future communications. As I informed you before I left New-York, it is a very extensive tract, consisting of at least twelve, or more properly, twenty square leagues of land, of every variety of aspect. It is watered by a fine river, with its tributary branches. The soil is the richest I ever saw, and the climate most favorable to vegetation. Every thing grows with the greatest rapidity and luxuriance. Indian corn attains the height of twelve to fifteen feet; this does not apply to a few isolated stalks, but to the entire plantation of corn, consisting of forty or fifty acres, where six stalks grow in the same hill, and all are well supplied with ears. It is the same for every thing else. Potatoes were planted some time ago, and in forty days the new potatoes were fit for use and were gathered. Coffee, and the sugar cane, of which large plantations have been commenced, succeed very well, and will, in a couple of years more, be a source of great revenue. There is not one tropical production, with which I am acquainted, that does not succeed well in this climate, and many are found in a state of nature on the plantation. The colonists here, so far, are few in number, all French; but the proprietor is very desirous to have some from the United States, farmers, mechanics, or artizans. I will state to you in brief the conditions on which colonists are admitted, or invited to come, and the inducements which the place holds out to the industrious and enterprizing, requesting you to give them publicity in your Journal. Should any applications be made, on information from you I will see that the necessary steps are taken to facilitate the emigration of those who may desire to join us.

The colonists may be either agriculturists, farm hands, or mechanics. As there is plenty of land here, the Franco-Mexican Company enters into the following arrangement with agriculturists, or other persons who may wish to employ a small capital in agricultural operations. Land is let to them in such quantity as they may desire, or according to their ability or means. The farms thus formed are supplied by the Company with the buildings necessary to lodge comfortably the colonist and his farm hands. The Company also provides the farm with the necessary implements, plants, and seeds, and fur-

nishes the nourishment of those employed on it. It will be perceived, therefore, that the agriculturist is lodged and fed by the Company, has land, and implements, and whatever else is necessary for the cultivation of the earth, provided him, on the condition of his improving the land thus granted. Of the produce, two thirds belong to the Company; the remaining third belongs to the colonist *forever*. He may sell his interest to another if he chooses, and retire; or he may retire and leave an agent or overseer on his farm, in which case his share of produce, one third, will be sent him wherever he pleases, in any shape he may desire. Nay, he need not even come here at all. One who has capital, (and a very small one will suffice,) may appoint an agent to take up land for him on the conditions above stated; or, what is better, he may signify to the Director of the Company his wish to take up a farm, and the Company, on receiving his remittances of the amount he may wish to invest, will open a farm and procure laborers, in proportion to the amount; bring the land into cultivation; and render him an account, every three months, of the state of his affairs; in a word, watch over them as if he were himself present. It will be seen at once that a permanent revenue may thus grow out of a small capital, and in a very short time, three years at most, after the commencement, for the objects mostly cultivated are vanilla, coffee, and sugar. Of these three valuable products plantations once established are permanent, and do not require to be constantly renewed. Vanilla is in full yield the third year after being planted; coffee in two years, (for the Company furnishes plants of a year old to commence with;) sugar cane in a year after the commencement of the plantation. Besides these, many other valuable articles may be cultivated, as chocolate, pimento, cloves, cinnamon, nutmeg, cochineal, tea, &c. all of which form permanent plantations, so that when the land is once brought into employ, the remainder of the labor is to gather in the produce.

Farm hands are lodged and fed at the expense of the Company, and receive a yearly salary, fixed by the Company at 400 francs, (about $80,) each man. If the hand be married, the wife also receives a salary of about $50; and if there be children of either sex above the age of 14 years, they also receive a salary of about $30 per annum, until their 18th year, when they have the same salary as above stated for grown persons. In the mean time, the children are educated at the expense of the Company, and if they or their parents, or any colonist, fall sick, they have the attendance of a physician, the use of the necessary remedies, and all necessary attention, not only without expense to themselves, but during the time of their illness they receive half of their regular salary. At the same time, they also have the right to take up land according to their ability. Farm hands form an engagement for three years, after which they are at liberty to make such arrangements as they think proper.

Mechanics are lodged and fed by the Company, and receive besides, for their services, such salary as may be agreed upon between themselves and the Director, or his agents. They also have the right to take up land, and employ hands to cultivate it for their profit, on the conditions above mentioned. Carpenters, blacksmiths, tinsmiths, potters, masons, wheelwrights, machinists—such are the mechanics most wanted here.

Another point to be considered is, that those who may settle, having their lodging and nourishment provided by the Company, are at a very trifling expense for their clothing, and some trifling articles of furniture. The climate is regular; there is no winter, no want of fuel or thick clothing; the coarsest material is the best, and where all live in the same simple style, there can be no necessity for expenses in this point; all absolute wants in other points are supplied by the Company.

The above statements are *facts*. The same statements, or similar ones, had been made to me previous to my coming to this place. I gave credit to them myself, because I knew I could rely on the character of him who made the statements. But I deferred giving them to any one for publication until I could say that I had seen myself what I stated. I have seen this land, its resources, its fertility, its advantages for commerce and improvement, and I know of no place where capital may be more advantageously employed. I do not hesitate to exhort those who are industrious and enterprizing, who are struggling to live on a small capital, to come here and employ their means in the manner explained above. They will have to labor hard for two or three years; they will have to endure privations for the same time; but at the end of that period they will be in the enjoyment of a certain revenue, which will augment every year thereafter. I speak of those who are industrious; let no one imagine that he may come here and be rich without work; that he will have no more to do than to gather up money from the earth and put it in his pocket; if he thinks so, he will find his mistake, and disappointment and misery will be the consequence. It is as impossible to grow rich in idleness in *this* country as in any other region.

I will gladly furnish any other particulars which may be desired. For the present, adieu. D * * *.

REMARKS.—The Company to which the above refers is composed principally of very respectable French capitalists. Applications for further information may be addressed, post-paid, to H. F. Dickehut, Jicaltepec, care of Le Verger freres, at Vera Cruz.—[ED.]

On Tropical Fibrous Plants. By H. PERRINE, M. D. To the Editor of the New-York Farmer.

[The following is a recapitulation of a very lengthy article *on the Agave subject*, in which Dr. P. points out the errors of Humboldt in respect to this family of plants. We regret that our space will not admit its insertion.—ED.]

1. There are *many species* of Agave and of analogous plants in the new continent besides the A. americana naturalized in the old, which can readily be distinguished by the external characters of their leaves, and which are very important differences in their interior organization.

2. That there are numerous species of Agave which yield foliaceous fibres differing both in quantity and quality, but that the species which are cultivated in Yucatan for those fibres alone are the most valuable fibrous leaved species whose history is accurately known.

3. That there are one or more species which are cultivated on the Mexican mountains solely for the inebriating juice of their undeveloped stems, and that the leaves of these species do not yield fibres which either in quantity or quality merit cultivation for their foliaceous fibres alone.

4. That the Agave americana of Europe is not the same species as the fibrous leaved Henequins of the hot lowlands of Yucatan, nor yet is it the same species as the juicy stemmed Magueys of the cool highlands of Mexico; nor does it even belong to the same genus as the Pita leaved Ixlla of the shady forests of Gaazacoalcos, and hence that the contradictory Humboldt and his credulous copyists have perpetrated pernicious errors in attributing the three different Mexican substitutes for the vine, the hemp, and the flax of Europe, to a distinct species of Agave there naturalized during the last century.

5. That although the flattering illusion of a wonderful combination of opposite properties in one and the same plant is now necessarily destroyed, yet that the best species of the juicy stemmed plants and of the coarse fibred leaved plants, and of the fine fibrous leaved plants, each merits an immediate introduction and extensive cultivation in the United States.

6. That there are various other species, and probably various varieties of said different species and genera of fibrous leaved plants, existing in many portions of the American continent, which merit experimental cultivation on a small scale, or an acclimating to determine the peculiar and relative value of their foliaceous fibres, both in quality and quantity.

7. That as the leaves of our own Agave virginica are also reported to contain useful fibres, experiments ought to be made to ascertain their relative value.

8. That the value of our Yucca filamentosa is already sufficiently determined to authorise its extensive cultivation, in proof of which I beg you to re-publish the letter of Judge Brackenridge to Col. White, dated Pensacola, 29th Dec., 1831, which first appeared among the documents annexed to the Report No. 454 of the 1st Session of the 22d Congress, made in my favor by the Committee on Agriculture, 26th April, 1832.

Very respectfully your obedient servant,

H. PERRINE.

Consulate U. S. A., Campeche, 1st Oct. 1832.

Use of Tanner's Bark in Cultivating the Strawberry. By H. H. [For the New-York Farmer and American Gardener's Magazine.]

MR. EDITOR,—I have a word to communicate upon the culture of the Garden Strawberry, that most delicious production of earth. I do not speak of the *kind*, or the *quality* of this fruit, but of the *method* to be adopted in cultivating any kind of it, in any soil. It is well known to all who have cultivated the strawberry, that much pains are requisite to keep a strawberry bed clear from grasses, and the too rapid increase of roots and runners, which hinders the fruitfulness of the parent stock. Indeed, such persevering attention is required during the summer months

to clip the runners or tendrils of the strawberry, to prevent their covering the whole ground, that were it not for the deliciousness of the fruit, and the convenience of having it at hand for so long a portion of the season, I should have relinquished the culture of it.

But while I was preparing my strawberry bed the last spring, and was speaking to a friend who had visited me from a distance, of the labor that was requisite to cultivate the strawberry with success, he said to me, "I have seen in one instance, in my part of the country, the expedient of applying tanners' bark, such as is used for banking houses for the winter, to the strawberry bed, filling the space between the hills to the depth of three or four inches." I asked him the utility of that. He said "it possessed the twofold advantage of preventing the growth of grass between the hills, and the fibres of the tendrils from striking into the ground and becoming roots to new stocks, whilst it did in no sense prevent the growth and fruitfulness of the hills." This appeared so rational that I at once applied the bark, and found it to succeed beyond my expectation. I had no occasion to hoe my strawberry bed through the season. If a grass appeared through the tan, I could remove the tan with my fingers and extract the weed from the roots, and replace the tan; and if a runner shot forth its fibres into the tan, and they became roots, it only required to raise the runner with the finger, and it would quit the bark the whole length of the tendril, with the greatest readiness, because there was not soil enough in the bark to fasten the roots, and the bark being coarse and dry, it would fall from the fibres as soon as the runner was raised. My strawberries did as well as others this season, with one half or one third the labor they formerly required, and I thought the tan prevented the too powerful action of the sun upon the roots of the strawberry, while the reflection of the sun from the surface of the bark tended to mature the fruit. There is another advantage derived from the tan: it prevents the strawberries from becoming covered with dirt, as they ordinarily are, during showers and heavy rains; and the tan, instead of detracting from the beauty of the garden, actually contributes to it. The green hills of the strawberry rising up through the red tan in regular order, have something of the appearance of verdant islands rising out of a placid ocean. I apprehend, likewise, that the tan will prove a defence to the roots against the freezing and thawing of winter, but I have not had experience in this. In the spring, when the bed is to be cultivated in the usual manner, we have only to scrape the tan aside, and replace it as soon as the bed is made. I should select tan that had been drenched by the snows and rains of one winter, lest there might be too much astringency in the bark directly from the vat of the tanner. I am, very respectfully, yours,

H. H.

Oct. 24, 1834.

Remarks.—The writer of the above is a clergyman, who has written some of the best communications that have appeared in the Farmer. He pays for his subscription in the above currency. We should be pleased to receive the same payment from other clergymen.—[Ed. N. Y. F.]

Farmers' Work for December. By the Editor.

Winter Expenses.—No small portion of farmers expend all the profits of summer in supporting their live stock in winter. There are two ways to avoid this—economising in their food, and increasing their manure. By a very trifling expense, every farmer can fit up a steaming apparatus. [See page 366.] In this not only potatoes, pumpkins, and other succulent food, can be steamed, but cut corn stalks rendered very palatable and nourishing food, not only for cattle, but for horses—especially if a little bran or meal is mixed with the stalks. Success, however, in economising, depends very much on the arrangements made. In calculations of economy, as well as in plans for the accomplishment of any particular object, the arrangements made should have reference to several years, and not to one winter only. The expenses, attending the fitting up the cheapest kind of steaming apparatus, may be, without a general plan, greater than the savings in one season. Scarcely a single apparatus or instrument can be introduced on a farm without its being connected with some others. For instance, a steaming apparatus for stalks and coarse hay implies a good straw-cutter. This again implies a horse power, if any considerable stock are kept. But a horse power is rather costly, unless it is also used for propelling a threshing machine, a cider mill, a cob and corn cracker, and for various other purposes. The steam apparatus, also, implies that root crops should be raised pretty extensively. Finally, there is little or no economy without a plan; and no good plan of farm economy can be fully carried into effect at once.

Another object of attention, in avoiding winter expenses, is the increasing of manure. Many farmers spend time and money in carting, in the busy season, manure that they purchase. If they would take more pains in making manure, in winter, they would save their money, and have more time in the growing season to devote to their crops. In the first place, the hogs should be confined to pens as small as convenience and their health will permit. The manure, from the other live stock, should be carefully preserved from waste. Leaves, swamp and ditch mud, scrapings and sweepings, and every thing that can be converted into manure, should be collected and put in to the pens and yards. The time and trouble, which this business causes, should not be regarded. We are well persuaded that a farmer, who has a team, and who would have to cart his purchased manure several miles, would find it to his interest to hire a man in winter expressly to collect manure.

Out Houses.—Another of the special attentions of the farmer is his outhouses for stock. These should be such as to render the animals comfortable. There cannot be much real economy in their food without paying attention to this particular. The stables and pens should be sufficiently close to keep out the cold, but not so much as to render the air unhealthy. When it is remembered how large a volume of air passes the lungs of a horse or cow, at every exhalation, proper ventilation seems of much importance. If there is much smell in the morning, it may be concluded that the stable is too confined, or that it is not kept sufficiently clean.

Fowls.—It is rather surprising that more attention is not paid to the profits of fowls. Chickens, ducks, turkeys, and geese, always command fair prices; and the eggs of the first will ever find a ready market. In winter, scarce an article, which the husbandman can carry to market, affords a more satisfactory return. If he has a comfortable house for them, and is in the habit of boiling potatoes and other vegetables for his stock, he will not have to complain of the expense of keeping his fowls. Like all other live stock, they will not be profitable unless suitable attention is given to them, without some plan is adopted and carefully executed.

Preserving Vegetables.—Turnips and potatoes will probably be dear until the next crop; therefore, it stands the farmer in hand to be very particular in preserving them. For appearance sake, the manure usually put outside of cellar windows, to keep out the frost, should be put on the inside. Nothing is more unsightly than these heaps of manure, as they are usually placed around the house. Most cellars are so constructed that a layer of dry horse manure, or of straw and earth, can be securely placed inside the window. It will thus be kept dry, and better repel the frost. If, however, the manure is put outside, it should be so neatly boarded as to be kept as dry as possible. Much heat is carried off with the moisture. In a cellar where there is a large quantity of vegetables, occasional ventilation should be given them, without materially altering the temperature of the air.

Animal and Vegetable Food.—Generally, vegetable food is cheaper and more wholesome, particularly for children. A large consumption of animal food is attended with more grossness; renders the system more liable to cutaneous diseases, and to more frequent and more violent fevers. It is principally habit in respect to these kinds of food. Some families habituate themselves to animal food three times a day; others, only twice or once, or not at all. A gentleman of our acquaintance has not tasted animal food for years; and during this time he has been, although much exposed, an entire stranger to ills and sickness. In ordinary seasons, one hog, weighing 300 lbs., would buy 40 bushels of the best kidney potatoes. A family of four hearty persons would not consume more than a half peck of potatoes a day, even if cooked in a variety of ways; the 40 bushels would then last 320 days. These four persons would require at least 2 lbs. of pork at supper and breakfast: they would thus consume the hog in 150 days. This is the season of the year for some persons to make calculations of this kind.

Cobs.—Those who have plenty of fuel will find it to some advantage to boil cobs broken up or pounded. A little salt added will make the liquid, when cool, nourishing to cows; and a little Indian meal or bran added to the boiled cobs will make them to be relished.

Bog Fence.—It strikes us that the following, from a Southern paper, suggests hints to some northern farmers:

"This is the season of the year to clear meadows of the bogs that frequently grow on low lands; and I would recommend, from my own experience, to cut up the bogs and build fence with them, by which means the land is doubly benefitted; first, by clearing it of that which is injurious: secondly, by making a fence which is equally substantial with that made of stone—independent of its compactness. After having tried different methods, I would recommend laying them after the

manner of stone fences. On low and wet lands it will settle much slower than on upland; the wild grass will cease to grow, and a spear grass commence, which, in two years, will connect the bogs. I would advise laying this fence three feet at bottom, and four feet high, with one lateral rail supported by stakes at each end, usually termed "stakes and rider," which will keep it in place. Although it settles considerably the first year, and gradually afterwards, I am convinced, from four years' experience, that it will endure ten years without any additional bogs; and it can be laid up at one-tenth expense of that which is made from stone."

UNIFORM FEEDING.—Regular feeding, in quantity, as well as at stated times, is of much importance, in respect to the ease with which cattle are kept. If working oxen or horses are for a time fed high, and then again sparingly, they lose much of their propensity to fatten, and become hard keepers.

TOP ONIONS.—Those seed onions that have sprouted, and are like to spoil, may be set out this month.

Agricultural Lyceums. By J. LIVINGSTON VAN DOREN. [For the New-York Farmer.]

This country is, and for many centuries must continue, an Agricultural Nation. That, Agriculture as a science is literally unknown to the vast majority of planters and farmers, and considered by them in any other light than that of a science, and consequently conducted to great disadvantage, is well known to the most superficial observer. It is proposed, therefore, to recommend to the good sense and pecuniary interests of the American farmers, and friends of Agriculture and Horticulture, the following plan for the promotion of practical and scientific Agriculture; which plan, if generally adopted throughout the country, will do more to promote the prosperity, wealth, intelligence, and virtue of this Nation, than any one thing since the Revolution. The plan is simple and practicable in every farming neighborhood in the United States. It wants only to be followed up spiritedly for one year to be appreciated and adhered to ever after. Wherever the plan is but known, let it be only tried—and the writer feels fully satisfied it will not soon be disregarded and forgotten, with the host of other ephemeral projects of the age. It is as follows: Let some one or more influential gentlemen in any neighborhood call a meeting of farmers and friends of agriculture at some convenient place, say at the public district school house, for the purpose of organizing an Agricultural Lyceum in their neighborhood. Should but a few only attend the first time, let them not be discouraged, but let a contribution be adopted and officers chosen. A constitution of somewhat the following might be proposed for their adoption.

1st. This Association shall be known by the name of the Agricultural Lyceum of ——.

2d. The object of this Lyceum shall be the mutual improvement of its members in scientific and practical Agriculture, Horticulture, and such other natural sciences as are connected with the same, together with the diffusion of the knowledge of such improvements as may benefit the cause of agriculture in our country.

3d. The following are the means proposed for accomplishing the above object, viz.:

1st. Stated meetings of the members of the Lyceum, for mutual interchange of sentiments and experience on practical subjects of farming, &c.

2d. Discussions on subjects previously proposed.

3d. Written essays on practical subjects, prepared by members of the Lyceum previously appointed.

4th. The establishment of an Agricultural Library.

5th. The reception of many or all the best periodicals on agriculture published in the United States and Great Britain.

6th. The encouragement of the members of the Lyceum in reading, and studying the science of agriculture.

7th. The assignment of certain experiments to each member of the Lyceum, to be made the following spring and summer, and the results to be reported to the Lyceum the following fall; and when successful and important, a description of the same be furnished to the Editor of some agricultural journal for publication.

4th. The officers of the Lyceum shall consist of a President, five Vice Presidents, one Corresponding Secretary, one Treasurer, one Recording Secretary, one Librarian, and an Executive Committee of five for general business.

5th. The officers of this Lyceum shall hold their office for one year from their appointment, and retain the same any time beyond the year till a new appointment be made.

6th. All persons paying the sum of three dollars a year shall be entitled to membership, and all the privileges of the same; and by paying at any one time the sum of twenty dollars, shall become a life member. All persons who have been regular members for ten years, and have paid their yearly subscription of three dollars for that time, shall be considered in future as a life member—and be exempt from any further payments.

7th. The funds of the Lyceum shall be disposed of at any time by a vote of the majority of the Lyceum, in the purchase of such books, agricultural periodicals, apparatus, implements of husbandry, seeds, fruits, trees, rare and curious plants &c. for the general advancement of the Society. All such purchases to be made by the Executive Committee.

Here may follow such other articles of the Constitution and By-Laws as the members may think proper to adopt.

In ordinary cases, no better place can be chosen for the regular meetings of the Lyceum than the district school house, or academy of the place; and the most proper person for the Librarian will generally be found to be the teacher, or principal of the school. Such an appointment will give him more influence in the place, and greater attention to the pupils and the patrons.

After the Lyceum is thus organised, let such of its members as have any works upon agriculture, or any subject related to it, either loan, present, or sell them to the Lyceum, towards the immediate establishment of a library. From the funds of the Lyceum let some two or three of the best agricultural periodicals in this country be subscribed for, not neglecting to obtain as many of the back numbers of each as can reasonably be had. Valuable books on agriculture, horticulture, cattle, soils, manures, &c., are to be had at the larger cities, which also ought to be purchased, as far as the funds of the Lyceum will warrant, and these purchases be continued yearly, as the regular income of the Society will permit. One or more essays on practical subjects previously appointed to be reported on, ought to be read at each meeting; after the reading of which, let the subject of the essay be publicly discussed by the members. If the time of the evening will allow, let a second subject be discussed. After the Lyceum is well established, and its circumstances will warrant, let some proper person be appointed to deliver a regular course of lectures on Chemistry, Natural Philosophy, and Botany. Young men, in particular, ought to be invited to take a very active part in the various duties, discussions and writing of essays. A general invitation of attendance should, by all means, be given to all, not even excluding ladies.

If the Lyceum is conducted spiritedly till spring, the members will be prepared to undertake a large number of experiments, which experiments ought to be assigned to such particular members of the Lyceum as would be best calculated to make them out successfully: due regard being had to the soil, and particular department of agriculture to which each member pays his special attention. In the fall, let each experiment be reported on before the Lyceum in writing, and their success or failure will afford abundant matter for discussion for some time; and when the cause of agriculture can be advanced by publishing the results of these experiments, let them be furnished to some editor by the corresponding secretary.

Who will attempt to estimate the vast amount of benefit our county would receive from the establishment of such Lyceums in every neighborhood? How great the amount of social intercourse, and enjoyment, will arise from these meetings! How great the number of young men, by finding agreeable and profitable employment and amusement in the duties of the Lyceum, will be diverted from the temptations to dissipation and vice in which so many have fallen! Let any minister of the gospel, lawyer, physician, teacher, and friend of letters and general improvement, enlist in making the experiment, and a blessing will doubtless attend their efforts. Yours, most respectfully,

J. LIVINGSTON VAN DOREN.

Questions addressed to a Farmer. By N. R.

[For the New-York Farmer.]

Do you know the kind or nature of the sub-soil of your farm?

Can the texture of your farm be improved, by mixing the lower soil with the surface one?

Are you sure you apply the manure most suitable for your land?

Have you ever made any close calculations to ascertain whether you are pursuing a course of farming best adapted to your situation and circumstances?

Have you ever considered the means by which mankind have advanced from a rude savage method of tilling the ground to the present system of farming?

Are you prejudiced against information derived from books?

Have you ever inquired whether you are foolish or rational in entertaining such a prejudice?

Have you a son who is addicted to ex-

cessive drinking, and fond of visiting public houses evenings and rainy days? Has he any taste for reading? Had you put into his hands an agricultural paper before he acquired the habit of drinking, do you not think it probable he would have become more interested in farming, and now been a temperate happy man?

Do you suppose it a matter of perfect indifference whether a farmer reads agricultural works or not? Do you suppose the benefits derived from such reading are to be placed in the balance with two or three dollars, the annual cost of such books?

Do you endeavor to impress your sons with the idea that their education on leaving school is by no means completed; that reading and writing, on practical subjects, are admirably calculated to strengthen the mind?

Are you willing to acknowledge that you and your sons think so superficially on all subjects relating to farming, that not a single thought enters your minds worthy of being put on paper, and sent to the New-York Farmer? Or are you so entirely unaccustomed to recording your thoughts, that you will not try to put them on paper? In either case, are you not mentally lazy? N. R.

White Vapor. By R. M. W. To the Editor of the New-York Farmer and American Gardener's Magazine.

Caroline.—But Mrs. B., the smoke that rises is white; if it was only caloric which escaped, we might feel, but could not see it.

Mrs. B.—This white vapor is formed by some of the particles of lime in a state of white dust.—[Conversations on Chemistry, p. 79.]

Mr. Fleet,—In forming a hot-bed last winter, I observed a white vapor arising from it when the heat came on. Was this white vapor particles of lime, rising with the caloric from the horse dung, or was it the hydrogen combined with the moisture of the atmosphere? Perhaps your correspondent A., by consulting some of his late writers on chemistry, can determine; but, for my part, I am so confoundedly ignorant that I cannot even guess why the steam or vapor of horse dung should be *white*.

R. M. W.

Oct. 21, 1834.

P. S.—It would seem that different chemists estimate the latent caloric differently, as 1200, 1500, and 6000 degrees below 0. Who shall decide when doctors disagree? The subject seems to have puzzled most writers; we may jump to a conclusion, but I think if we reason we shall doubt.

Specific Food of Plants. By R. M. W. To the Editor of the New-York Farmer and American Gardener's Magazine.

Besides, I have before stated, plants sometimes contain substances which neither air nor water can produce.—[N. Y. Farmer, p. 292.]

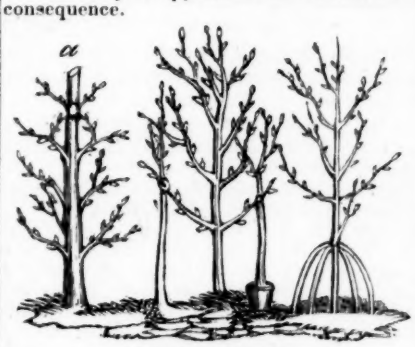
Mr. Fleet,—I was yesterday reading Professor Rennie, Professor Lindsley, Macaire, Candolle's, &c. notions about specific food and excrementaneous deposition by the roots of plants, proportions and ingredients not found on analysis, when I fell asleep and had a curious dream, some of the particulars of which I will give you for the entertainment of the public. Methought I was in a large room, somewhat resembling a green-house; the Chinese air plant, the evergreen, and numerous others, were suspended from the ceiling 10 feet from the earth. There was the misletoe and moss, &c. &c. growing on trees 10 feet from the earth. I could perceive much specific food jumping and entering by the spongeolets of the roots, particularly of the Chinese air plant, (which had neither roots nor spongeolets.) I could perceive also descending from the roots of these plants much excrementaneous matter, and hiding itself in the earth without increasing its bulk or weight. I could also perceive much potash, narcotic juice, lime, and various other ingredients, trying to enter through the spongeolets into the economy of plants; in short, it was a very curious dream, and perhaps your correspondent A. can expound it to the comprehension of community; by doing so, he will deserve well of all wizards. R. M. W.

Oct. 23, 1834.

NEW PUBLICATIONS.

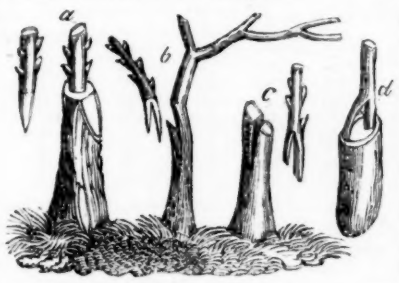
Alphabet of Scientific Gardening for the Use of Beginners. By James Rennie, M. A., Professor of Zoology, King's College, London. 18mo. pp. 120, William Orr, London, 1833. [Continued from page 268.]

Grafting by Approach, or In-Arching.—This is to grafting what layers are to striking, the graft-slip not being cut off, but taken from a plant growing near the stock upon which it is suffered to remain till the joining is completed. Mr. T. A. Knight employed this mode not only for the purpose of filling up from itself the parts of a wall-tree deficient in bearing wood, (*a.*) but also of improving the quality of fruits. It might be advantageously used in a similar way to fill up the gaps in quickset and other hedges, where beauty of appearance is considered of consequence.

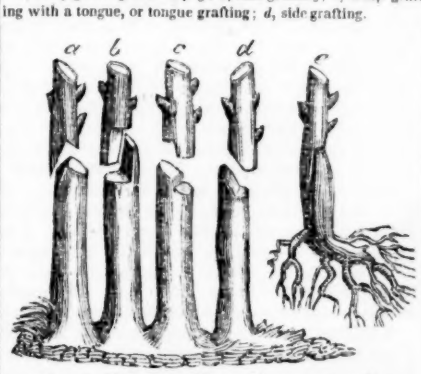


Examples of In-arching.

Slip, or Scion Grafting.—The slips taken off from one plant and joined to another, have the parts to be joined cut in various manners, according to the sort of plant, the size of the parts, and other circumstances. These will be better understood from the following figures, than from mere verbal description.



a, whip grafting with a peg; *b*, side grafting; *c*, whip grafting with a tongue, or tongue grafting; *d*, side grafting.



a, *b*, *c*, *d*, chink, or shoulder grafting; *e*, root grafting.

Professor Thouin has enumerated about fifty methods of grafting, but they all depend upon the same principles as already explained,

Bud Grafting, or Budding.—Instead of a slip, or scion, the bud of one plant may be so inserted into the bark of another as to grow, and produce branches, flowers, and fruit. It is requisite for this purpose that a leaf bud, known by its tapering sharp point, be selected, and not a flower-bud, known by its bulging and rather blunt point. It is necessary that the leaf connected with a bud be cut off, otherwise it would soon exhaust the sap, and the bud would wither and die. It is also necessary that the bark separate freely, which is the test for there being pulp enough to form a joining. When the bud is inserted, it must be tied round with a riband of bass, to exclude the air. Fine rose standards are thus formed.

Herb Grafting.—Though grafting is usually confined to trees, De Candolle thinks all plants may perhaps be capable of being so treated, and Baron de Tschoudy has in this way succeeded even with annual plants, as well as with the soft young shoots of trees; but it is necessary to success to have it performed near to or at the inner base of a living leaf, which serves to attract the sap.

In the case of plants with succulent leaves, it has been asserted, on authority, that "the union is imperfect," from the adhesion being "by the cellular substance" only, "no woody matter" being transmitted to the stock. That this is quite erroneous is shown by the striking instance of a Cactus truncatus grafted on a Cactus triangularis in the king's garden at Neuilly, as beautifully dissected and drawn by M. Turpin. This also equally disproves the common opinion that the graft in such cases is merely kept alive by the moisture supplied by the stock, and would do as well if stuck into a potato or a piece of moist sponge. It certainly furnishes a strong disproof of the baseless theory that maintains buds and grafts to send down woody matter to the stock, as roots descend into the soil.

Scientific Principles of Thinning and Weeding.—It must be obvious, from the facts previously detailed, respecting the food of plants and its preparation in the leaves, that if they are crowded closely together, their roots must go to the same spot to procure nourishment, which they will consequently soon exhaust, and become therefore more or less starved, while the branches and leaves, by mutually interfering, must prevent therein the free circulation of air, and, by overshadowing the ground, must also prevent therein the free circulation of water. I was particularly struck with the illustration of these views, on passing last autumn through the hemp fields in Baden, and in Switzerland, the plants which were crowded together being tall, slender, and without branches, intended for the manufacture of linen; while those intended for seed, which were scattered about on headlands and in corners, and never two together, were robust, and loaded with numerous branches of considerable extent, like little standard trees.

It will appear from this illustration, that plants must be sown and kept crowded or apart, according to the object aimed at in their cultivation; crowded when it is required to make them slender, like the linen hemp; and far apart, like the seed hemp, when it is required to have them large, strong, and bushy.

Seeds have sometimes to be sown thickly, in the case of early crops, that the plants may afford mutual protection, but when they have acquired a little strength, they may be safely thinned out, so as to allow more room for those which remain. If the plants, however, are either not very vigorous, or very tall and slender, as is always the case with crowded forest trees, the thinning must be gradual, otherwise too hasty exposure to the weather may prove injurious.

Weeding is an operation much more neces-

sary than thinning, as weeds which spring up unbidden are useless for garden purposes, though they may be interesting to the botanist. It is often impossible to guard against the introduction of those weeds which have seeds that float in the air, such as groundsel, thistles, and dandelion, but all which have non-floating seeds may be got rid of in a few years by grubbing up the young plants before they form seed. Weeds with runners or with creeping roots are difficult to extirpate, in consequence of the smallest portion of them left in the soil readily striking and forming new plants.

Scientific Principles of Pruning.—There are few operations of gardening that require to have the facts respecting the food and circulation of the juices in plants studied more carefully than pruning; none, in which practice is often so much at direct variance with the principles of science. Pruning is performed with various designs; sometimes for modifying the form and size of a tree, and sometimes for modifying the production of fruit in quantity and quality.

The chief circumstances to be borne in mind with respect to pruning, for the purposes of influencing shape or size, are that the head or branches will always be in proportion to the roots and the food with which they are furnished. It will therefore be obviously preposterous to dream of checking the luxuriance of a tree by cutting out its branches in autumn or winter; for no sooner does the sap begin to flow in spring, than fresh branches will arise from the strongest branch buds below where the pruning was made, and the same quantity of sap being furnished, the tree will very soon be as luxuriant as before the operation. Frequently it will be more so, for the pulp laid up in the roots the preceding autumn will be more apt to cause new root fibres than in an unpruned tree. So true is this, that weak and old trees are often headed down to render them luxuriant; though the same gardeners will also extensively lop luxuriant trees in the winter, with the hope (certain to be frustrated) of checking their growth.

The true principle of dwarfing a tree, when space cannot be afforded it for expanding, is to dig a trench down to the roots, and prune them shorter; or to bend down the branches, as we shall see under training.

Summer pruning, however, has a different effect, and when young shoots and suckers are thinned off in summer, they prevent a tree from exhausting itself.

With respect to the modifications of fruit-bearing, Mr. Hayward has well remarked that "whether the supply of food be great or small, the fluids taken up must flow or spread over a proportionate surface of trunk, branches, and leaves, and be duly exposed to the action of light, heat, and air, before a tree can attain a perfect fructiferous state.

"All trees are furnished with many more buds than they can sustain to form fruit and branches, the position of the buds determining their office; and those formed for wood buds occupy the most eligible situations for extending the branches; the others form fruit buds, or lie dormant until wanted to supply the casual loss of any wood buds above them.

"In all erect growing trees placed in an open situation, and where the light falls equally, the flow of sap is vertical, and the strongest or leading branches will form in this until the stem or trunk acquires a certain age or elevation, which is determined by the soil, situation, and nature of the tree; but in places where the light is obstructed on any side, the flow of sap inclines towards the light.

"If a bud formed and placed for a leading branch be removed, or the vessels connected with it are contracted and injured, and the usual passage of the sap obstructed, the wood bud occupying the next best position will take its supply and perform its office: and when, from any number of wood buds, formed to receive a quantity of sap, a part be taken away, the share of sap which that part would otherwise have received is given to those remaining, and they are extended proportionally."

It would not be easy, I think, to give a more clear and succinct account of the leading principles of pruning, than this from Mr. Hayward, taking along with it what has been said above on thinning, and on light and air. The practice, so far as regards particular species and the seasons best adapted for the operation, will come to be treated of in detail when I take up Fruit Gardening.

NEW-YORK FARMER.

DECEMBER 1, 1834.

WEATHER AND CROPS FOR NOVEMBER.—Most of this month has been favorable for gathering corn, not housed last month, and sufficiently mild to cause turnips to bottom well.

It is to be presumed that farmers will obtain fair prices for all their crops, although general peace and plenty appear to exist throughout the civilized world.

The following article on cotton, from the Savannah Georgian, is not unlike those on other products we should be pleased to have communicated to the Farmer.

The pivots on which the foreign markets are expected to turn are the small stocks, and reported short crops in this country; it is well, therefore, to ascertain the extent of danger from the one, and the truth of the other.

And first, then, with regard to the former, we find on the 2d Sept. that the stocks in the ports of Great Britain varied only two thousand bales from what they were at the same time last year, but that the import of American cotton had been upwards of 110,000 bales more, and the import from other countries nearly equal, consequently most persons are led to infer that the consumption must have increased in the same ratio as the import. To a superficial observer, this would be perfectly satisfactory, but to those who have their industry and capital at stake, and are dependent on their penetration and judgment, it is incumbent to look beyond the surface. The consumption of Great Britain was, in

1824—633,000,	of which	395,000	were American;
1825—567,000,	do.	325,000	do.
1826—551,000,	do.	379,000	do.
1827—715,000,	do.	500,000	do.
1828—733,000,	do.	505,000	do.
1829—751,000,	do.	504,000	do.
1830—807,000,	do.	540,000	do.
1831—873,000,	do.	611,000	do.
1832—866,000,	do.	622,000	do.
1833—892,000,	do.	650,000	do.

Commencing with the year 1827, we find, for 3 years, the consumption of American descriptions remained stationary—in 1830 it increased 36,000 bales—in 1831, 71,000—in 1832, 11,000—and in 1833, 28,000. In 1831, the year in which the greatest increase occurred, it was believed that spinners held 20,000 bales more than usual at the close of the year; and this estimate, most probably, was rather under than over the true quantity, as the apparent increase in consumption in the following year was only 11,000 bales.

The import of cotton into Great Britain, up to the 1st September, was 811,000 bales, to which add 210,000 bales for the last four months of this year, being 18,000 bales less than the import in the same period of last year, and it gives a total for the year of 1,021,000 bales. The consumption last year was 892,000 bales; now add an average weekly increase of 600 bales, and an export of 68,000 bales, being the same as last year, and a total is had of 991,000 bales, to be deducted from the import, leaving an increase of 30,000 bales in the hands of consumers, or in the ports at the end of the year, over the stocks on the 1st January last; thus, all fears of any actual scarcity in Great Britain, at the close of this year, are utterly groundless; and even should the speculators in Liverpool and in this country succeed in their efforts to advance prices there, to leave shipments at present rates, which are now here two to three cents per lb. above the Liverpool quotation of the 4th October. Without loss, such advance can only be momentary, as past experience fully testified. Spinners will use up their stocks, rather than buy at higher prices before January, when an ample supply from this country will relieve their wants.

The growing crop promised to be so abundant, up to the middle of August, that estimates were made in the Southern States that the product would be 140 to 150,000 bales. The prospects in September changed the aspect of things, and these estimates were reduced. On the 20th of October, as is usual about that period, a frost visited this State, and those north of it; and doubts have been suggested whether the product of this season will be equal to the last. From all the information I have gained, the product of Virginia and North Carolina will not vary 10,000 bales, from last year; that of South Carolina and Georgia, not 20,000 bales; while Florida, it is admitted, will increase 15,000 bales. So Alabama, whose exports go through Mobile, will have an increase of 25,000 bales. The export of New-Orleans, it is conceded, will be more than last year; the increase variously estimated from 30 to 50,000 bales. I doubt not it will be the latter, thus making an increase of 90,000 bales in the Gulf of Mexico, from which deduct the deficiency in the Atlantic States; 60,000 bales are then left to be added to the last crop, thereby making the estimated growth of this year 1,265,000 bales. That there are good grounds for this estimate, is apparent from the increased quantity of land planted in every state, and that the frost has done much less damage generally, where it has been felt, than was at first expected. In Florida, South Alabama, Louisiana, and Mississippi, the frost occasions no perceptible injury; and daily accounts from these States represent improving prospects of large crops, and I doubt not this will be the result, judging from the very favorable weather for gathering cotton experienced in this State since the 1st day of October.

Another consideration suggested by present high prices, if foreign markets are pushed up to corresponding rates, is, whether the consumption must not be necessarily curtailed; for while sanguine individuals assert that a few cents per lb. added to the value of the raw material is not felt when manufactured into goods, it is evident they speak without consideration, as clearly appears from a calculation of the difference of 3½ cts. per lb. between the average of present prices in this market, nearly 16 cents per lb. for Liverpool, fair quality, and of 12½ cents, the average of last year for the same description. Take this difference on 1,028,000 bales, the export of last season to Europe, average weight of each bale 360 lbs., and it amounts to the enormous sum of 12,952,800 dollars—and on the consumption of 200,000, bales in this country, it amounts to 2,520,000 dollars,—making an aggregate of 15,112,800 dollars.

An exhibition of these facts, and the reasonings deduced therefrom, must carry conviction to the minds of the unprejudiced, that there is no danger of a short supply, and that present prices are extremely hazardous. Is it then not reasonable to conclude, should the rates now current be maintained, that the requirement of such immense additional sums of money from Europe and the North may derange commerce, re-act upon and depress prices, entail losses, and end in the ruin of many.

MERCATOR.

Savannah, 15th November, 1834.

EVERGREEN TREES.—In passing through a section of Westchester, we observed a house standing on a bleak eminence, but it had all the appearance of protection and comfort from a clump or grove of evergreens at each end of the house. We saw another large dwelling standing on a still higher elevation, and over-looking a great extent of country. Being at some distance from it, we could perceive scarcely a sign of a tree within half a mile of the house. Whatever deciduous shrubbery might have been about the house, having lost their leaves, they could not be seen. For the want of a few evergreens near the house, one could scarcely keep from shivering at the thought of a human being living there in winter.

TURNIP SLICING CART.—At the Ipswich Lamb Fair, Mr. Ransome presented a machine in the form of a cart, which will spread them over the field for the sheep as the horse walks along.

BUTTER.—A small lump of old butter put into the cream, while churning, is said to make the butter come sooner.

WOOL.—The increase of wool in the United States for the last two years has been estimated at the rate of 20 per cent. per annum. Moore's Philadelphia Price Current says the amount of wool raised last year, and brought into market, was about 60,000,000 lbs.; this year it is probably 75,000,000; and next year it will be 90,000,000 pounds. England produces 160,000,000 of pounds annually, and as all her grazing lands are taken up, she cannot be expected to produce much more. She imports on an average 20,000,000 lbs. from Germany, and 10,000,000 from Spain. The United States, then, at the present rate of increase, will soon take the lead in amount, and very probably in quality, and with so vast a territory adapted for sheep grazing, will become the great wool market of the world.—[Gen. Farmer.]

FLOUR OF SLIPPERY ELM.—We live, Mr. Editor, but to learn and obtain knowledge. Being in the country a few days since to visit a sick friend, I was shown an article entirely new to me, which is said to be remarkably nutricious and palatable, for debilitated and sick persons. It was flour, prepared by the Shakers, from Slippery Elm, and used the same as arrow root. One table-spoonful of this flour, boiled in a pint of new milk, is excellent to feed infants weaned from the breast; they will not only fatten upon it, but it will prevent bowel complaint. It makes an easy and nutricious diet for consumptive and dispeptic persons. From the character I received of it, I presume that it only need be known to become of general use. It is sold by Isaac Thompson, druggist, corner of Market and Second streets.—[Phil. U. S. Gazette.]

Remarks.—The above is often called the red elm, Ulmus rubra. With the exception of the maritime districts of Carolina and Georgia, it is found in all parts of the United States and Canadas. It is not in as great abundance as the white elm, but is superior for timber. Its buds being larger and rounder than those of the white, the tree can thus be distinguished in winter. Towards their developement in the spring, they are covered with a russet down. The leaves, like the buds, are more oval, being oval-acuminate, doubly denticulated, and larger, thicker, and rougher, than those of the white.

We should be pleased to have, from some of our readers, the method of preparing this flour.

DOMESTIC ECONOMY.—There are some simple questions in domestic economy which are worthy the attention of all our farmers and agricultural men. They relate immediately to the importance of possessing good stock, and valuable species of animals, which appear to excite but little attention in most agricultural communities. Cows which yield only their ten quarts of milk per day to one man, are certainly much less productive than his neighbor's animals, which, perhaps, with the same expense in labor and keeping, yield him his twenty quarts. The profit of two dairy farms, where the relative difference between the animals is in such striking disproportion, would astonish every individual when ascertained at the termination of the year. Yet this is hardly an imaginary case. Regardless of considerations like these, a large number of poor, comparatively worthless animals, are kept by our farmers, who cannot be impressed with the great importance of substituting better and more profitable beasts in their stead.

But sheep husbandry will illustrate this principle more fully. A. has a flock of eight hundred Saxony or Merinoes, which yield four pounds at each shearing, making the product of his flock 3,200 pounds annually. At the price for which wool is now selling in Boston, say 75 cents, the proceeds of A.'s sheep would be $2,400; B., his neighbor, has an equal number of sheep, though of an inferior quality, but requiring the same food and attendance as A.'s. They will yield, perhaps, 3 pounds to a fleece, giving annually 2,500 pounds. This sort of wool, at 40 cents, the present price, will yield B. $960, making a difference of $1,500 between the productive character of A. and B.'s sheep. Now, it is one of the first principles in political economy to obtain from the smallest surface of soil, or specific number of animals, the greatest amount of gain. By comparing the products of the two flocks of an equal number owned by A. and B. is not the difference, to a discriminating mind, most astonishing?

The above simple exposition of the profits on cows and sheep of different kinds, will apply with much the same force to all animals kept by farmers. An experienced individual, who is intimate with the details of raising sheep, suggests to us the absolute importance that they should be kept well. Indeed, the same remark applies to all animals, from whom profit, in the shape of periodical produce, is expected. Cows, from an insufficiency of food, or that of an inferior quality, deteriorate both in kind and quantity of their milk, which surely is wretched economy; and sheep, with inferior food, and but half enough of it, not only diminish most essentially the amount of wool they yield, but they are unable to sustain their lambs, and the natural consequence follows—they die.

APPLES.—A Philadelphia paper says, the orchards immediately on the borders of the Delaware bore nearly their usual quantity, while through the State generally the supply has entirely failed. In this part of the country, there were very few apples except on orchards in the villages and meadows near the Connecticut, but we are informed that the scarcity does not extend to all of the eastern counties.—[Hampshire Gazette.]

A SQUASH.—We have now in our office a squash, raised by Mr. Joseph Carpenter, on a farm in Smithfield, belonging to Nicholas Brown, Esq., of this city, which measures *four feet seven inches* round the middle, in one direction, and *four feet four inches* in the other. It weighs *fifty-six pounds*, and sprung from seed brought from Marietta, Ohio.—[Providence Journal.]

THE DATE PALM TREE has been planted with success in Georgia. A branch has lately been exhibited in Savannah containing about 200 dates of a rich golden color.

LONG ISLAND RAILROAD.—We have received a small pamphlet, containing, with other information, the Reports of the Engineers on the Practicability of the Long Island Railroad. One of the Engineers, Wm. C. Young, observes that, "as there will occur on the grading no rock excavation, or bridges more important or costly than a class of sluice-ways, and as the grubbing and cleaning will be in a light growth of timber, and the excavations and embankments in gravel and sandy loam soil, I infer five thousand dollars per mile, on an average, will cover the expense of grading the road bed for a double track." The other engineer, D. B. Douglass, estimates all the expenses of every description, including those attending the roads from Jamaica to Brooklyn, and to Williamsburgh, at $1,557,000. He assumes *five hours* as a fair average trip from Brooklyn to Greenport, the eastern extremity of the road, and *six hours and a half* from the latter place to Boston.

"The distance," says Mr. Douglass, "from Greenport to New London is, say fifteen miles, and the passage may be effected therefore in an *hour and a half*, making *six hours and a half* from New-York to New-London.

"By constructing a wharf at Rocky Point, on the Sound shore, opposite Greenport, a termination may be given to the railroad on that side, only eight miles from the mouth of Connecticut river, (in Connecticut,) and by means of a ferry, a passenger will have it in his power to reach the wharf at Saybrook in *five hours and a half* or *six hours* from New-York.

"The trade and travelling which now reaches New-York from the various harbors of Peconic Bay, Shelter Island, Gardiner's Island, and the South Branch, will, in all probability, be diverted to the railroad, as soon as the latter shall be built. The number of vessels now engaged in this trade is from forty to forty-five, and the average number of passengers during the summer months about one hundred per day.

"The vicinity just mentioned is one of great and growing interest to the citizens of New-York, as a place of summer residence and sea bathing, and the same may be said also of a large proportion of both shores of Long Island. The increased facility furnished by the railroad for the enjoyment of this luxury is calculated, therefore, to subserve the health and comfort of the city, and to make the road itself a favorite and fashionable avenue. The trade and business of the *interior* of the Island, including many articles of market supply, which now find an imperfect and uncertain conveyance by water, would reach the city more certainly, as well as more profitably, both to the buyer and the seller, by this conveyance.

"Lastly, the maritime position of Greenport, its convenience as a *harbor*, unobstructed, at all seasons of the year, and the facility with which it can be made by ships coming on the coast in certain states of the wind—these, and other considerations of a like kind, give it an interesting relation to the city of New-York, as an outport and harbor of safety; and should a railroad communication be established, so as to bring it, for the conveyance of passengers, mail bags, and light merchandise, within *five hours* of the city, it would doubtless contribute essentially, in many instances, to the certainty and despatch of commercial operations."

Owing to the very light expense attending the construction of this road, and to the great increase of travelling and business, which, in our full belief, will take place, this stock, in our opinion, will pay good interest, and rise in the market.

BOTANICAL TOUR.—It affords us pleasure to transfer from the New-York Gazette the following notice.

Among the passengers in the packet ship South America, which sailed on the 1st inst. for Liverpool, were Messrs. Brown and McNab. These gentlemen, says a correspondent, arrived here in June last on a botanical tour through the United States and Canada, under the auspices of the Royal Botanic Garden of Edinburgh. They have during this short period explored an immense tract of country, and have taken back with them several hundred entire new plants to add to that already splendid establishment. They express themselves delighted with our *Eden-like* wilderness—glorious decked margin rivers, and magnificent lakes. They have, in pursuit of their object, taken up their abode in dreary forests and marshes, and paddled their canoe with the Indians on Lake Huron. These scientific expeditions having matters of pure taste in view, it is to be hoped will be often repeated, as there is perhaps no region on earth so full of interest to the lover of botanical research as North America, whose noble lakes, rivers, and prairies, are, from the month of May till September, perfect gardens of the most beautiful flowers and shrubs, and which, for the most part, succeed admirably when transplanted into the well kept gardens of Europe.

STEAM CARRIAGES ON COMMON ROADS.—We are pleased to record the following, having, as we do, great faith in the successful application of steam to road carriages.

The New-Bedford Gazette states, that a project is on foot for the construction of a road from that town, through Taunton, to Boston, for the purpose of being used for steam carriages; and a series of letters from Robert Mills, Esq., the projector, is commenced in that paper on the subject. The advantages of this description of locomotive travel, over that upon a railroad, are urged with great earnestness and considerable plausibility.

ANIMAL POWER.—Dupin states, that the animal power in Great Britain is eleven times as great as the manual power, while in France it is only four times as great.

The following is the number of horses for every 1000 inhabitants in the countries mentioned. Hanover, 193; Sweden, 145; Canton de Vaud, in Switzerland, 140; Great Britain, 100; Prussia, six Provinces, 95; France, 79.—[Quar. Jour. of Agr.]

DEATH OF THE MULE'S COLT.—As the birth of the phenomenon, *my mule colt*, was recorded in your Register, [see Appendix N.Y. Farmer, v. vii., p. 43,] so I will, with your permission, record his death, that the learned may speculate upon it. He was born, as I informed you, as will be seen in your Register of May or June, 1834, on the 23d of April, 1834, and died on the 20th of October, 1834, at night. The particulars are as follows: on Friday evening, late, I was informed that the mule colt was sick; upon examining him, I thought he had the staggers. He was freely bled, and put in a lot, and went to eating fodder; it was now dark, and I determined that in the morning I would commence blistering, purging, and the use of injections, which I have never known to fail if taken in time—but in the morning he had the lock jaw, and so nothing could be done effectually for him, and he died on the Monday night following. He was weaned, and running in a good pasture with a horse colt, also just weaned, which is doing well. Now, was it the staggers, or what disease? Or was ever a colt delivered of a mule known to live? I should have been much pleased to raise it, and to have known if it could continue its species. John T. Kilby, Nansemond, 22d October, 1834.—[Farmers' Register.]

COTTON SEED AND OIL MILL.—Mr. Fleet: Some of your correspondents would confer a favor by supplying you, at my cost, with one or two pounds of the best varieties of cotton seed grown in the United States. I wish also prices and descriptions of the best oil mills, particularly for cotton seed oil. Yours, &c.

H. F. D.

COTTON SEED OIL.—The editor of the Mobile Advertiser has been presented with a demijohn of cotton seed oil, prepared at the oil factory of Messrs. Couper & Plummer. "For the last four or five nights," says the editor, "there has been no other kind of oil used in lamps in our printing office, and we now consider the experiment as fairly and impartially concluded. We have no hesitation in pronouncing it every way equal to sperm oil for the use of the lamp. The flame produced is believed to be even whiter and clearer than that by the best winter strained sperm oil. When undergoing decomposition by burning, the smoke given out is not in so large quantity as that emitted by the ordinary oil, and there is no offensive smell either in the smoke or in the oil itself. Messrs. Dobson & Williams, we understand, will, hereafter, act as agents for the proprietors, for this manufacturing establishment in this city."

THE FÆCAL EXCRETIONS OF PLANTS.—We are pleased to find the following notice, and expect, from the "inquiry," to have much light on the subject.

The committee of botany of the British Association for the Advancement of Science have requested Professor Daubeny, of Oxford, "to institute an extended inquiry into the exact nature of the secretions by the roots of the principal cultivated plants and weeds of agriculture; and that the attention of botanists and chemists be invited to the degree in which such secretions are poisonous to the plants that yield them, or to others; and to the most ready method of decomposing these secretions by manures, or other means." Dr. Lindley has also proposed the same thing as a desideratum.

The Cause of Malaria, in the pestilential districts of Italy, has generally been supposed to be the decomposition of vegetable matter on a moist surface. This, however, is to confound the malaria with the marsh fever. The former is now thought to proceed from a very different cause, and to be analogous to what in England is called the hay fever. It is found that, while the corn or hay crop is in a growing state in the pestilential districts, they are as healthy as any part of Italy; but that, the moment the crop is cut down, or withers on the ground, the malaria commences, and continues through the autumn and winter, till vegetation becomes vigorous in the following spring. The neighborhood of Rome, where malaria is so prevalent, "is very hilly, dry, and entirely without vegetation. For days together, one sees nothing but desolate dried up corn fields, without trees, bushes, or wood of any description. In early times, Rome was surrounded by extensive sacred woods, which were not suffered to be destroyed. At that period malaria was unknown, though intermitting fevers were well known in the Pontine Marshes. The avarice of the popes, however, converted these sacred woods into gold, and so desolated the region that not a tree or wood is to be met with around Rome. With the commencement of this system of extirpation the malaria appeared, and has at length reached such a height, that, yearly, many are carried gradually off by it; and, in the summer months, strangers and respectable inhabitants quit Rome. When we take into consideration all the phenomena of marshy districts, the conclusion does not lie far distant, that the atmosphere is in different degrees rendered unfit for human organization, not by the passage of the water to the air, but by the decomposition and solution of vegetable substances; and that thus those various intermitting fevers, and even the plague itself, are produced. In the case of real malaria, in opposition to marsh fevers, the circumstances are different. So long as the earth is covered with living vegetables, as, for example, with corn, the air of the most suspected district is pure and healthy, and no one fears being attacked by the disease; but, when the prodigious crops, which in those volcanic loose-soiled districts are speedily brought to maturity, are removed, does the surface of the earth become dead at the warmest and most energetic period of its functions? or does not rather a portion of those substances, which were consumed by the leaves and roots of the plants, now go to the atmosphere, and render it unfavorable for the breathing of man, until all is again restored to an equilibrium in higher or more distant regions? That carbonaceous matter is beneficial to the vegetable kingdom is as well known as that it is prejudicial to the breathing process in animals. No educated person in Germany doubts the organic function of the earth, to which also the cholera itself has been ascribed; and when a more general regard to nature advances to the south, the sacred woods will again gradually surround Rome, large vine branches entwine themselves round the elms, the hills be thus again covered, and the malaria reduced within limits. The fact is not without interest, that all real malaria districts are of volcanic formation, and that they are often to be found at the boundary of volcanic and non-volcanic rocks." [Jameson's Journal, vol. xvii., p. 167.] In several districts in England, the country people are liable to attacks of fever immediately after the removal of the hay crop, some individuals much more so than others. This may be considered as a species of malaria of a comparatively mild description.

PRESERVING BEES IN WINTER.—Mr. Ethridge, of Montrose, Pew, who keeps a considerable quantity of bees, buried several of his hives in the ground during the fall of last year. They were placed in a sufficient depth to be out of the reach of frost, and in such a manner that the air could by no means penetrate, being first covered with straw to about the thickness of ten inches, before being covered with mould; they were taken up in April, and the bees were found to be in good health. They had made use of no honey, as there appeared to be as much honey in the spring as when the hives were buried in the autumn.

A MODE OF PACKING FRUIT TREES FOR EXPORTATION.—I received last month a package of fruit trees from Boston, North America, from Mr. W. Kenrick, whose New American Orchardist is reviewed in IX., 354. I send a description of Mr. Kenrick's mode of packing, which I think an approvable one for publication. He lays the roots in wet moss, and this is secured by means of bass mats, not only about the roots, but clear from the stems. A strong stake is placed in the centre of the bundle of trees, and these are well packed in straw, and bass mats, not put into a box. It appears to me that this mode is preferable to packing the trees in a box; for, when the roots are packed in wet moss, and the branches are laid bare in the box, a considerable degree of damp arises from the moss, and stagnates upon the branches, to the destruction of some of the trees, as when the trees are unpacked and exposed to the air, the branches of some of them turn black and purple in several places, and the trees soon die. On the contrary, when the trees are not packed in a box, the dampness from the wet moss is allowed to escape, and the branches are not injured by the stagnation of it upon them. The trees I have received from Mr. Kenrick were not at all affected in their branches, but were perfectly free from all dis-

ease, and the branches of the pear trees had sent out young shoots among the straw. The following are the names of the kinds of fruit trees which I have received from Mr. Kenrick: all of them are described in his New American Orchardist.

Apples: American summer pearmain, Benone, St. Lawrence, Maiden blush, Summer queen, Summer rose, William's apple, Aunt's apple, Kenrick's red autumn, Killam Hill, Newark king, Hubbundston's Nons, Marquise, Peck's pleasant, Penock red winter, Priestley, Royal pearmain.

Pears: Julienne, Dix, Gore's, Heathcot Lodge, Wilkinson, Lewis, Thomson, Cushon. M. Saul. Sulyard street, Lancaster, June 7, 1834.—[Loudon.]

Teasels.—There has been a great rise in the price of the teasel, or fuller's thistle, and some farmers in Hatfield and Williamsburgh have lately received large sums of money for the produce of small quantities of land. Three or four years since, teasels were sold at 75 cents per thousand, and some as low as 67 cents; now the manufacturers give from $2 37 to $2 50 per thousand. Two farmers in Williamsburgh have recently sold teasels to the amount of $1500. In Hatfield, a single acre has in some instances yielded 100,000 teasels, which have brought over 237 dollars. There are very few acres, however, that do this. Two years are necessary to bring a teasel crop to maturity; the plants require much care and labor, and are liable to be winter-killed and to other injuries. After the price fell to 67 or 75 cents, the cultivation was relinquished by many, and the present high prices are owing to a great diminution in the quantity raised.—[New Hampshire Gazette.]

Calves.—The district of Strathaven, in Lanarkshire, is celebrated throughout Scotland for the excellence of its veal, and there the only plan pursued is simply feeding the calves on milk alone, without the addition of any extraneous food, or nostrums for promoting rest, and without having recourse to bleeding.

Cure for the Sting of a Wasp.—A few days ago, happening to be in the country, we witnessed the efficacy of the remedy for the sting of a wasp, mentioned in one of our late papers. A little boy was stung severely, and was in great torture, until an onion was applied to the part affected, when the cure was instantaneous. This important and simple remedy cannot be too generally known, and we pledge ourselves to the fact before stated.—[Liverpool Mercury.]

Mange in Hogs.—Mr. Editor: During my travels through the state, especially in towns and villages, I saw a vast number of swine dying with what is called the mange, while many others were upon the eve of expiring. This disease is very easily cured if persons would take the trouble of pulverizing sulphur, and give to each hog affected one table spoonful in a little corn meal dough, twice a week, for two weeks; they will shed the scurf, and become perfectly clean, and fatten. The sulphur at the same time destroys lice and fleas on the swine. S. M. M'Donough, Ga., 19th May, 1834.—[Southern Journal.

Gapes or Pip in Poultry.—It is said, and we believe truly, that a little soap and probably strong soap suds mixed with Indian meal, or other food for chickens, will cure a distressing and often fatal disorder called gapes or pip.

Sore Backs in Horses.—White lead, moistened with milk, or sweet oil, has been recommended as the most effective application in this complaint.

Malady among Mice.—A remarkable phenomenon has been observed in the neighborhood of Frankfort. It is a sudden malady among the mice, thousands of which are found dead or dying in the fields.

A Lapland Summer, including also what in other countries is called spring and autumn, consists of fifty-six days, as follows:

June 23, Snow melts.
July 1, Snow gone.
" 9, Fields quite green.
" 17, Plants at full growth.
" 25, Plants in full blow.
August 2, Fruits ripe.
" 10, Plants shed their seeds.
" 18, Snow.

From this time to June 23, the ground is every where covered with snow, and the waters with ice.

Wood Snapping on the Fire.—I believe we have no wood in this country that is more worthless for fuel than the butternut. A few *cuts* of this kind, however, about ten inches in diameter, had been split in two, left some weeks to dry, and then carried into my chamber. On placing one stick on the fire, it began to snap most remarkably: sometimes there were not less than fifteen or twenty sparks on the carpet at once; and the inconvenience was serious. What was to be done? I happened to recollect a paragraph in your 2d volume, taken from some eastern paper, stating that *wood snaps on the fire from the side nearest to the heart.* It was so in this case. I just turned the log over, and the difficulty was at an end; for though it continued to snap for some time against the back plate, yet no more sparks came into the room. When I put on the next log I was particular to turn the heart backwards, and I have had no trouble from snapping since. Now the knowledge of this thing is but a trifle indeed, but it may be worth knowing, for I have often seen the guests round a parlor fire starting up to put out the sparks, when, I presume, nothing more was wanting than to turn over a stick. A Farmer.—[Gen. Farmer.]

Method of Building Chimneys that will not Smoke.—Contract the space immediately over the fire, so you may be sure of the air being well heated *there;* this will ensure a current upwards. All chimneys should be carefully built, and every joint well filled with mortar, so as prevent communication in case of fire.—[Dr. Thomas Cooper.]

Feather Beds.—The want of feathers is altogether artificial, arising from a disregard of the physical and moral well-being of infants and children; and he who has the good fortune never to have been accustomed to a feather bed, will never in health need or desire one, nor in sickness, except in cases of great morbid irritation, or excessive sensibility, or some disease in which the pressure of a firm or elastic substance might occasion pain. But when a rational regard to the preservation of health shall pervade the community, feathers will no more be used without necessity, or medical advice, than ardent spirits will be swallowed without the same necessity or advice. The physician has frequent occasion to see persons who are heated, sweated, and enfeebled, by sleeping on feathers, as if from a fit of sickness, enervated, dispirited, relaxed, and miserable.—[Med. Intel.]

Potato Starch.—Let the potato be taken and grated down to a pulp, and the pulp placed upon a fine sieve, and water made to pass through it; the water will be found to have carried off with it an infinite number of particles, which it will afterwards deposit in the form of white powder, separable by decantation, which powder is starch, possessing all the essential properties of wheaten starch.—[Loudon.]

Sun-flower Seed—Cure for Founder.—"The seeds of sun-flower," says a correspondent of the Zanesville Gazette, "are one of the best remedies known for the cure of founder in horses. Immediately on discovering that your horse is foundered, mix about a pint of the whole seed in his feed, and it will effect a perfect cure."

American Beef and Pork in Canada.—We learn from the Montreal papers, that the British Government has given a decision in favor of allowing American beef and pork salted to be exported from the Canadian to other British ports, duty free. This will enable the West Indies to obtain their articles of provision at a much cheaper rate than heretofore. The consequence of this decision will be to create a more extensive demand for beef and pork from New-York, Pennsylvania, Ohio, and Michigan, in the Montreal and Quebec markets.—[New-York Gazette.]

Worth attending to.—As this is about the time when our friends are beginning to smoke their meat, it may do them some good, to inform them that a small bit of brimstone, about the size of a chinquepin, thrown into the fire once a day, will effectually prevent skippers and bugs from getting into the bacon. This information we have from a friend whom we highly esteem, and who assured us that he had so fully tried the efficacy of this plan, that he wished us to make it generally known. He added that no uncommon smell or taste is imparted to the bacon. We deem this information of great importance to those who have bacon to cure; also, to those who have to buy it.—[Salisb. Watchman.]

Pickling Pork.—The following is the method formerly practised for *baconing*, or pickling pork, by the famous buccaniers of America. First, they cut the flesh into long pieces, about an inch and a half thick; and, after sprinkling it with salt, and suffering it to remain in that state for twenty-four hours, these slices were next dried in stoves, till they acquired a bony hardness, and a deep brown color. Pork, treated in this manner, if packed in casks, may be preserved for upwards of a whole year; and when soaked in luke-warm water, becomes plump, and has a rosy appearance. It likewise possesses a grateful flavor under the various forms of cookery, and is relished by the most delicate palate.—[Domestic Encyclopedia.]

Preservation of Meat.—Meat may be preserved fresh many months by keeping it immersed in molasses. A joint of meat, or any provision, suspended in a flannel bag, will keep sweet much longer than by most of the modes commonly practised. The cooler and dryer the meat is when the flannel is put round it the better, and the flannel should be perfectly clean. Fresh meat put in a close vessel containing vinegar, will be preserved a considerable time. Tainted meat will be rendered good by pickling it in pearl-ash water some time. Before it is cooked, however, it should be dipped in vinegar a short time, and then salted in brine.

To have Mince Pies any time.—Prepare your meat by boiling and chopping as though it were for immediate use—mix it with a suitable portion of suet, spice, and salt; then put it in an earthen pot, pound it down with a pestle, and then cover it with the best of molasses; keep it where it will not freeze, and it will be fit for use any time. My wife has adopted the above course for four or five years past with perfect success; so that we have had mince pies made from meat killed in December as constant in July following as in January, and quite as acceptable.—[Maine Farmer.]

Pumpkin Apple Sauce.—A facetious writer in the Franklin Mercury mistook the following dish, prepared by his wife, for very excellent apple sauce.

Take a good ripe pumpkin, pare and slice it into pieces as nearly resembling quarters of apples as you can; stew the pumpkin thus prepared in a sufficient quantum of boiled cider to cover it, for about 30 minutes—then add a quantity of apples pared and quartered equal to the pumpkin. Stew the whole for 30 minutes longer, and it is done.

FAIR OF THE ROSS COUNTY AGRICULTURAL SOCIETY.—Our correspondent, F. E. R., has sent us the Sciota Gazette, containing a list of the premiums awarded at the Fair held on the 1st of November at Chilicothe. Among the numerous premiums was one for one hundred bushels of sweet potatoes from two acres.

We have not space for more than the following extract.

This was the second Exhibition and Fair of the Ross County Agricultural Society, and was more fully attended than the first. The citizens assembled in great numbers from this and the adjoining counties. The cattle recently imported by the Ohio Company for importing English Cattle were exhibited, and fully realized the expectations of their owners and citizens generally. These cattle, costing from $300 to $700 per head, attracted a large crowd of experienced graziers, and other citizens.

The fair was numerously attended, and it is gratifying to remark that many of the ladies, with the most commendable spirit, contributed to the handsome and useful specimens of domestic manufactures exhibited. The carpeting, jeans, flannel, stockings, socks, &c. were beautiful specimens of their kind; and great taste and ingenuity was displayed in the quilts and counterpanes which were exhibited, showing that the ladies of Ohio can successfully compete in the manufacture of whatever may contribute to domestic comfort and utility. Specimens of tailoring, exhibited by Mr. Steele, and Messrs. Fairbank & Reynolds, were very neat of their kind; and are deserving of much praise. Beautiful specimens of hats were exhibited. The committee on manufactures reported that the specimens of hats exhibited by Swift & M'Ginnis and E. W. Smith were so nearly of equal excellence, that it was difficult to determine to which of the exhibitors to award the premium. The specimens of both would do credit to any city.

The cheese was of the very best quality, and does honor to the manufacturer. We hope that our farmers may be encouraged in this branch of domestic economy.

The specimens of cabinet work, saddlery, sculpture, ornamental painting, &c. were of rare beauty and merit, particularly the specimens of sculpture by Mr. Neely, and painting and graining by Mr. Emmett.

The cattle exhibited on the 1st comprised a good number of valuable short horned stock. We particularly noticed a cow and calf of Gov. Trimble's; the calf sold for $150. Several very fine animals—quite as beautiful and desirable as any we saw—were exhibited by Mr. Renick, of Pickaway county. A young bull, the property of Mr. David Crouse, of Ross county, bred by Mr. Renick, of the Durham stock, about eleven months old, weighing 970 lbs., attracted much attention.

This exhibition and fair gives us the assurance that the society will continue to prosecute its object with zeal and alacrity, and we invite the co-operation of all those who are friendly to Agricultural pursuits, Domestic Manufactures, Commerce, and the Arts.

The Premiums and Certificates will be handed to successful competitors in a few days. Due notice of the time and place will be given by the President.

N. W. THATCHER, Sec'y.

LARGE PEAR.—A correspondent of the Boston Advertiser says he had the pleasure of partaking, in company with seven other gentlemen, of a Duchesse d'Angouleme pear, measuring a foot round. It was melting, juicy, sweet, with a fine aroma. The color, a bright straw, with a slight blush on one side; the skin, very thin and delicate.

It was raised by Mr. S. G. Perkins, of Brookline, near Boston.

GREEN CORN IN WINTER. — *Mr. Fleet:* Green corn in winter I know to be very good, and your directions, page 301, of the Farmer, are good, but I think susceptible of some improvement. Instead of immersing the green corn in boiling water, heat an oven as you would do for bread, only not quite so hot, in which lay the corn on the cob; when it is sufficiently cooked, lay it in the sun to dry; when dry, take it off the cob as directed in yours, and it will be found much sweeter than if immersed in water. It should be soaked before used in a little warm water for twelve hours, then boil in the same water with a few beans, and it will make as good *suckatash* as in August or September. A HOUSEKEEPER.

Oct. 25th, 1834.

WHITE GOOSEBERRY.—This gooseberry is noticed in Loudon's Magazine as having been introduced from North America in 1827.

R. niveum is of the appearance and height of the common European species of gooseberry, and it has some similarity to the R. trifloruni, an American species; but it is quite distinct from both. The berry of R. niveum is of "about the size of that of the black currant, [R. nigrum,] and of the same deep rich purple color. It has altogether the appearance of a small smooth gooseberry; but its flavor is very different: it is entirely destitute of the flatness which is more or less perceptible in even the best gooseberries; in lieu of which it has a rich subacid, vinous, rather perfumed flavor, which is extremely agreeable. The fruit is rather too acid to be eaten raw; but, when ripe, it makes delicious tarts, and would probably form an excellent means of improving the common gooseberry by hybridising." [Bot. Reg., August.] R. niveum, apart from these considerations, is an addition to the number of the hardy species of shrubs. Its flowers, white, pendulous, and small, are borne in pairs and threes from the centre of the clusters (each of two or three) of leaves.

THE SHADDOCK AND THE MANGO.—The shaddock contains generally thirty-two seeds, two of which only will reproduce shaddocks; and these two it is impossible to distinguish. The rest will yield, some sweet oranges, others bitter ones, others, again, forbidden fruit, and, in short, all the varieties of the orange: but, until the trees actually are in bearing, no one can guess what the fruit is likely to prove; and even then the seeds which produce shaddocks, although taken from a tree remarkable for the excellence of its fruit, will frequently yield only such as are scarcely eatable. So, also, the varieties of the mango are infinite; the fruit of no two trees resembling each other; and the seeds of the very finest mango, (although sown and cultivated with the utmost care,) seldom affording anything at all like the parent stock. [Lewis's Journal, as quoted in the Literary Gazette, March 1, 1834, p. 151.] Can any of your readers, (Dr. Hamilton, of Plymouth, for instance,) inform me to what extent the assertions above, respecting the shaddock, are true? If the seeds of a shaddock will not only produce shaddocks, but oranges and lemons, the fact will be as wonderful as the primula of the Rev. Mr. Herbert, which produced, from one seed-pod, auriculas, polyanthuses, cowslips, and primroses. JAMES ROBERTS. York, March 5, 1834.—[Loudon's Gardener's Magazine.]

OXALIS CRENATA.—Should you have received any account of the late exhibition at Falmouth, on the 28th of last month, you will have learned that one of the greatest difficulties attending the cultivation of the Oxalis crenata has been surmounted; Mr. Pringle, the intelligent and enterprising gardener of L. C. Daubuz, Esq., of Truro, having upon that occasion produced a dish of the tubers of this plant, the growth of the present year, which were much admired both for their size and beauty. Mr. Pringle will, I trust, communicate the process by which he has succeeded in obtaining this desirable result, through the medium of your valuable Magazine, to the public for general information. You will also have learned from that report, (inserted in the West Briton of the 30th of May,) that Sir C. Lemon, with that zeal for science, and that desire to promote the interests of society, for which he has ever been so honorably distinguished, has this year attempted the field culture of these tubers upon a large scale: the result of so important an experiment will not, I trust, be kept from the public, even should its success fall short of our most reasonable expectations. WM. HAMILTON, 15 Oxford Place, Plymouth, June 13, 1834.—[Gar. Mag.]

THE WHEAT GRAINS FROM CARACCAS, kindly sent by you last season, of the earliness of which so much was written in the newspapers, I sowed part of, at the same time with my field wheat, near the end of October. It stood the winter well, and came into ear on the 30th of May, just thirteen days earlier than common wheat in the same field. Although I never entertained extravagant notions as to having in this northern climate anything like two crops in a season, yet, if it ripens, as I trust it may, a fortnight earlier than the ordinary varieties, it may be of immense importance in the agriculture of this part of the kingdom, which is near the northern limits of growing wheat, if not nearly on a level with high-water tides. At this place, the highest elevation at which wheat can be cultivated with success, is 400 ft. above the level of the sea. It so happens that a farm on this estate, which I occupy, extends in height from 300 to nearly 800 feet, so that I have an excellent opportunity of proving whether the new wheat may extend the limits hitherto fixed for the culture of that important grain. One good thing I remark is, that it does not seem so liable to rust as many other varieties of that grain are on their first introduction. I will hereafter communicate to you its time of ripening, quality, and appearance of fertility; and, in short, will pay to it all the attention it may deserve. A. GORRIE.—[Gar. Mag.]

[The above is, we believe, called Victoria wheat.—ED. N. Y. FARMER.]

YUCCA STARCH.—Mr. Watts has sent me a sample of yucca starch, which, he says, a friend assured him was equal to carpenters' glue; and which can be purchased at Carthagena for 1½d. the Spanish pound; he also sent me some manteca de corozo, or palm oil, which is used for lamps, and which may be held at Carthagena for 8s. per gallon, or 50 dollars per tun, of 252 gallons; while seal oil sells here for from 110 to 120 dollars per tun, or above 100 per cent dearer. Mr. Watts wishes for information as to how far these might be productive objects of commerce. Every addition to our imports from South America, not only first to civilise the inhabitants, and put an end to those distractions, which every friend of humanity must deplore, but to promote industry and sobriety of habits among the inhabitants; to give employment to a large quantity of British shipping, and a greater number of sailors; to improve the receipts of our customs; and provide an abundant market for our manufactures, upon which the doors of the European market are gradually, but with too fatal a certainty, closing, and which the insane and suicidal proceedings of the Trades' Unions are so blindly assisting our rivals in trade and manufactures to close. Hence, it has long been my wish and endeavor to divert the tide of British industry, and domestic as well as colonial enterprise, into new channels which, cannot be so readily closed; and in which we have little to apprehend from successful rivalry. This has been the incessant aim of my foreign

correspondence for the last ten years, and in this object I have been ably and generally seconded, both by Mr. George Watts and his ill-used father. If our success has not been proportionate to our wishes, the fault does not wholly rest with us.—[Loudon's Magazine.]

DIRECTIONS FOR MAKING OX-CARTS, AND FOR USING THEM.—Although we are not competent to pronounce on the merits of the following article, yet the enormous weight of an ox-cart has ever been with us associated with cruelty.

Essex County, Sept. 20, 1834.

The tongue of an ox-cart should be about fifteen feet in length, split as usual, and let into the cart axle by mortice and tenon, and confined by three-quarter inch iron pins. The axle should be rather more than seven feet in length, (I cannot say exactly, as some hubs are rather longer than others,) and about six inches by four and a half, of seasoned timber, or it will spring, and the friction will be very great. Saw up a hickory large enough for several. Lay off the shoulders four feet apart, neither more nor less, as this is the usual length, and if more or less, the labor of the oxen will be greatly increased, as one wheel will run in the rut that other carriages have made, and the other wheel over the uneven surface alongside of the other rut. Draw a line down the middle of the broad side, (the side intended for the tongue to be up,) which will leave three inches on each side of the line: lay off the diameter of the in-box from the bottom, leaving all at the shoulder to be taken off at top. The difference in the diameter of the in and out box divide into two equal parts, and lay off one part from the bottom of the axle at the end of the length of the hub; then lay off from that the diameter of the out-box. Now the diameter of both boxes is laid off, draw a line from one to the other, and hew off bottom and top. The reason for dividing in half the difference between the size of the big and little box, and taking all off under the axle at the little box and none at the big one, is to bring the wheel perfectly plumb. After finishing the broad side of the axle, turn the narrow side up, (the one that is intended for the top,) and draw a line down the middle, which will leave two and a quarter inches on each side; then take the diameter of the in-box, and divide it into two equal parts; one part lay off back of the line at the shoulder, the other on the other side of the line; then lay off the length of the hub from the shoulder, near which will come the linch pin, take the diameter of the out-box, and divide it into three equal parts; one part lay off back of the line at the end of the length of the hub, the other two parts lay off on the other side of the line. Now the diameter of both boxes is laid off, draw a line from one to the other, and round the squares. The reason for laying off at the little box one part behind and two before, is to make the wheel, in running, gently press to the shoulder of the axle. Were it equally divided into two parts, the wheel would be as apt to run off as on, and the consequence would be, should it pass off, there would be an open space between the hub of the wheel and the axle, into which the wheel would throw mud and dirt, which would at once sweep out the grease, and the constant and regular supply of grit would wear out boxes and axle. But what would be worse than all, it would so much increase the labor of the oxen. Inattention to making cart axles probably costs Virginia 1000 oxen annually. At best they are badly provided for, and the additional labor which this imposes upon them they are very unable to bear, and as they become reduced in strength, the lash is applied to supply the place of strength, and thus the poor animals are murdered. An axle made in the way here recommended requires no additional labor to overcome unnecessary friction.

The body should be made of seasoned timber to prevent it being shaken to pieces; the sills should be three and a half, by three inches, the length nine feet, and twenty inches deep in the clear; the width should be four inches greater behind than before, to facilitate the discharge of the load; and to prevent the sides from being broken by a sudden turn of the oxen, the sides should be confined by four iron rods half an inch in diameter, made with heads, taps and screws, and placed at the sides near each end—a set will last one's life. The greatest breadth of the body at the axle cannot exceed four feet, unless elevated above the hubs, which should not be the case, for the load will be constantly pressing forward and give too much weight before. If, to obviate this, a piece should be put across the tongue, or nailed to the sill of the cart, where it rests upon the tongue, the body is raised, and of course more inconvenient to load—the centre of gravity is also raised. From experience, I think by far the better way is to hang it with strong hooks and eyes, not in the way they are generally hung, for they have too much play, and throw the body in contact with the hubs, but to make the eyes of three-quarter inch iron, allowing as little play as possible. The shanks to those that go into the axle should not be more than six inches long; when over long, the body is inconvenient to put on and take off. Taper them a little just at the point, to make them slip more easy into the axle, sink the eyes a little into the axle, and let them stand up straight, not bent down. The shanks to those that go through the sills of the cart should be three-quarters of an inch square, and confined by screw and tap. Sink the eyes a little into the sills. They should be put one foot nearer the hind part of the body than the fore part, and no more, or it will give too much weight before. That mode of loading, as if the necks of oxen were stronger than the cart wheels, is a very mistaken notion; it is death to oxen. In many countries they have carriages so constructed as to give no weight. A cart-man, requesting assistance to enable him to discharge his load by throwing up the body, is a proof that something is wrong, and should be at once examined into. Are the hooks and eyes too far behind? Has he passed over uneven ground, that has caused the load to press too much forward? Or has he loaded improperly?

The yoke should be, for common sized oxen, from four to four and a half feet in length, the holes for the bows one and a half inches in diameter, and about five inches apart, more or less, to suit the size of the oxen, and so bored as to be rather nearer at top than at bottom. The yoke should be rather round than flat between the bows, to prevent galling. The chain of the foremost oxen should not be hitched to the staple in the yoke of the tongue oxen, but to a clevice attached to the end of the tongue of the cart, which should not be nailed to the top and bottom, but to the sides; and the wooden pin under the tongue, which is used to prevent the cart from running on the oxen, should be sufficiently long not to let the end of the tongue touch the ground, which will prevent the clevice from being broken loose by the dropping down of the tongue. When fixed in this way they pull much more, but cannot in any way pull much, compared to the tongue oxen. Some farmers drive three yoke to one cart, but there is nothing gained by it. A load of grain with us for one yoke of oxen is twenty bushels; for two yoke, thirty bushels. So the foremost yoke of oxen are allowed to draw only half as much as the tongue oxen; the third yoke of course would draw only in proportion, without allowing any thing for the weight of the cart. They do well in hot and dry weather to walk before, and kick up the dust, to suffocate those that are laboring behind; and in winter to pick their way and jerk those behind to the right and left that are doing all the work. One yoke well kept will do more work than three poor ones, because they pull to a much greater advantage.

A marl cart body, for four oxen, should be made of light materials, and should be about six feet long, four feet two inches wide behind, three feet ten inches wide before, all outside measure, and one foot deep in the clear, and without a tail-board. Then, when loaded, it will hold about fifteen bushels. The hooks and eyes should be three inches nearer behind than before. For further fixtures respecting this body, see a piece written by me, and published in Vol. I., page 197, of the Farmers' Register. EDMUND F. NOEL.

HORSES AND OXEN.—M. Dupetitmont, in a late agricultural work, examines the advantages of cultivating land by the labor of horses, and by that of oxen. He concludes that the food of horses costs twice as much as that of the oxen required to perform the same work; that horses have 261 kinds of diseases, and oxen only 47; and that the manure produced by a horse will enrich only half as much land as that furnished by an ox.—[Gen. Far.]

A GREAT YIELD.—Mr. Aaron Curtis, of Ithaca, raised the past season, on a quarter of an acre of land in the village, the following articles:

100 bushels of Onions, worth 75 cts. per bushel, - - - - - - -		$75,00
50 bushels of Beets, worth 50 cents per bushel, - - - - - - -		25,00
700 heads of fine Cabbage, worth $4 per hundred, - - - - - -		28,00
Lettuce, worth - - - -		10,00
Top Onion Seed, worth - - -		5,00
		$143,00
Onions, deficient by bad sowing, 20 bushels, - - - -	$15,00	
Beets, deficient by bad seed, 10 bushels, - - - - -	5,00	
		$20,00
Net proceeds, - -		$123,00

The whole time employed to raise the above crop was 24 days.—[Genesee Farmer.]

WOODEN RUSTIC WORK FOR GARDENS.—The advantages of wooden rustic work is that it can be adapted to a great variety of purposes. Thus very beautiful and even architectural temples may be formed of unbarked wood. Ornamental doors, every description of garden seats, and flower baskets and vases of very elegant forms, may be composed of the same material. Shady walks also, having the pleasing gloom and enriched effect of a Gothic cloister, may be made of wooden rustic work. I allude more particularly to what I call wood mosaic, which is, I believe, rather a modern invention. It is formed of split sticks of various lengths and sizes, and having bark of different colors. The pieces are nailed to any flat surface of wood, and very beautiful and elaborate patterns may be produced by arranging the pieces according to their sizes and the various colors of the work. Garden seats and vases of almost any shape may be covered with this kind of mosaic work, but as it is not durable when exposed to the weather, it is most suitable for the inside of summer houses and garden temples. In such situations the richest specimens might be introduced, and if varnished over they would last for a number of years. There are some handsome and rather costly specimens of this kind of ornament in the flower garden of Bagshot Park.—[Gardener's Mag.]

METHOD OF PRESERVING FLOWERS WITH THEIR NATURAL COLORS.—A method has since been mentioned to me, by which colors of the flowers of plants are well preserved. The process was this: the paper being first heated before the fire, or in an oven, the plant recently gathered is placed between two hot sheets, and pressed. It is requisite, however, that the paper, in the same heated state, be renewed at intervals, on account of the expressed juices from the stalks and leaves fermenting, which might otherwise injure the plants. There is also a method of preserving plants in flower, by which their natural form, as well as colors, can be preserved. It consists in placing the plant in a jar, and pouring fine sand upon it, until the whole plant is covered: it is then to be placed, still kept in the jar, into an oven; after which, being taken out, and the sand removed, the plant is found preserved both in its form and color.—[Bennett's Wanderings in New South Wales.]

COOKING FOOD FOR CATTLE.—Mr. Dederer, of Orange County, has a vessel in the shape of an inverted common churn, holding about 20 bushels. A tube goes from a large kettle of water into the bottom of this vessel. Between two or three hours are required to steam this quantity of potatoes.

The following article is from the Complete Farmer.

Among the most useful improvements of modern husbandry may be numbered the practice of steaming or boiling food for domestic animals. Some account of the origin of this practice in Great Britain may be found in the *Complete Grazier*, an English work of reputation, from which we have made the following extracts.

"Steamed food may be given to milch cows to great advantage. For this important fact in rural economy, we are indebted to the ingenious and persevering experiments of J. C. Curwin, Esq. M. P., whose attention to the comforts of his tenants, and judicious zeal for the improvement of agriculture, are too well known to require any eulogy. In prosecution of a system which he had long practised, of giving cooked food to animals, Mr. C. turned his attention to the cheapest mode of supplying milch cows with it; and in a communication to the Society for the Encouragement of the Arts, &c. (which was honored with their lesser gold medal,) he stated his belief that he has at length been completely successful. He uses a steam boiler of 100 gallons contents, on each side of which are fixed three boxes, containing 11 stones* each of chaff, (the husks of wheat, rye, &c.,) which, by being steamed, gain more than one third of their original weight. The steam is conveyed by various cocks into the lower part of the boxes; and thus two or three boxes may be steamed at the same time; the quantity of fuel required was about 2 lbs. for each stone of chaff.

"In giving the steamed chaff to the cattle, 2 lbs. of oil cake were mixed with one stone of chaff; and the milch cows are fed with it, morning and evening, having an allowance of one stone at each time. On being taken from the steamer, the food is put into wooden boxes, which are mounted on wheels, to be drawn to the place where it is intended to be used; and the chaff requires to stand some time before it is fit for use.

"The average milk on a stock of thirty-six milch cows was nearly 13 wine quarts for 320 days. The cows were never suffered to be turned out; and to prevent their being lame, their hoofs were properly pared, and they stood with their fore feet on clay. One great advantage attending this method was, that most, if not all the milch cows, were in such a condition, that with a few weeks feeding, after they were dry, they became fit for the shambles with very little loss from the first cost. As a substitute for chaff and oil cake, Mr. C. recommends cut hay; which, when steamed, would make very superior food, and he entertains no doubt would greatly augment the milk as well as the health of the animals."

An apparatus for steaming food for cattle should be considered a necessary appendage of every arable and dairy farm of a moderate size. The advantage of preparing different sorts of roots, as well as even grain, chaff and hay, by means of steaming apparatus, for the nourishment of cattle, begins now to be generally understood. It has been long known that many sorts of roots, and particularly the potatoe, become much more valuable by undergoing this sort of preparation. And it is equally well known that, when thus prepared, they have been employed alone as a substitute for grain, with cut chaff for hay and grain, in the feeding of horses as well as other animals. To a farmer who keeps horses or cattle, or even swine or poultry, the practice of boiling their food in steam is so great a saving and advantage, that it deserves the most particular attention. Though potatoes have often been given raw, both to horses and cattle, they are found to be greatly preferable when cooked by steam, as they are thereby rendered much drier and more nutritive, and better than when boiled in water; this has been long since shown by the experiments of Wakefield of Liverpool, who, in order to ascertain it, fed some of his horses on steamed and some on raw potatoes, and soon found the horses fed on the steamed potatoes had greatly the advantage in every respect. Those fed on steamed potatoes looked perfectly smooth and sleek, while the others were quite rough.

A steaming machine, on a simple and economical plan, consists of a boiler and a wooden chest, or box, placed over or near it. The box may be of any size, and so placed as to be supplied and emptied by wheel or hand-barrows, in the easiest manner, either by the end or top, or both, being made to open. If the box is made 8 feet by 5, and 3 feet deep, it will hold as many potatoes as will feed 50 cows for 24 hours, and these may be steamed in an hour.

The practice of cooking food for cattle is by no means a novelty in New England. A simple apparatus, for this purpose much used, is as follows:

A kettle, holding twelve gallons, or more, is set in a furnace of brick or stone, and over this a hogshead with one head taken out and the other bored full of holes. This is set so close that the steam of the kettle, when boiling, can only rise through the holes, and thence ascend among the articles to be boiled in the hogshead, and pass off at the top. In this way a hogshead of potatoes will be nearly as soon boiled as a small part of them could be if placed in the kettle underneath.

As the kettle is so closed as to prevent any steam from passing off, but through the bottom of the hogshead, a pipe or tube is set in such a manner that, with the aid of a funnel, water may be poured into the kettle as often as is necessary. After the water is poured in, the tube is stopped with a plug for that purpose.

Grain of all kinds may be steam boiled to great advantage, for feeding and fattening cattle; but in that case it is requisite to have the bottom of the hogshead covered with a cloth, to prevent the grain from running down through the holes.

In the 5th volume of the N. E. Farmer, p. 306, are some notices of the use made of steam in preparing food for cattle, in a letter from R. Smith, Esq., President of the Maryland Agricultural Society, on the management of Dairy Cattle, &c., to John Hare Powel, Esq.

"For the purpose of augmenting the quantity and improving the quality of the food of every kind, I have established a steaming apparatus. It consists of a boiler and two wooden boxes, in which boxes is steamed the food. These boxes contain each eighty bushels. By this simple apparatus, every species of coarse vegetable offal is converted into nourishing food, and all the ordinary provender is rendered more nutritious.

"In the dairies near Philadelphia, it is well known that sweet butter, of the first quality, cannot be made but from cream *quickly* produced from *fresh* milk, and that whenever the milk remains many days to produce its cream, such cream acquires an unpleasant taste, that is imparted to the butter.

"Since the month of January, 1823, my dairy people have been in the practice of always placing the pans, containing the milk, in water simmering hot. The oily parts, which constitute the cream, are by such heat separated from the other ingredients, and then, from their specific lightness, they of course ascend to the top in the form of cream. Cream is thus obtained, during the coldest weather in winter, in the course of about twelve hours after the milk has been taken from the cows. And the operation of churning such cream never exceeds twenty-five minutes. The milk pans remain in the hot water about thirty minutes. The butter has invariably been of a fine flavor, and of a beautiful yellow color; and, in the nature of things, it never can be otherwise, unless the dairy woman should be utterly ignorant of the art of making sweet butter.

"It may not be amiss to state to you that the skim-milk under this process is a very pleasant beverage. In summer and winter it bears the agitation of a carriage without becoming sour. And every morning, through the year, a person comes to the farm and takes from 250 to 300 quarts, for which he pays two cents per quart, cash; and on the same day he retails the whole, among the people of the town, at three cents per quart.

"The hot water, in which the milk pans are placed, is contained in large flat wooden vessels, attached to a stove. The water is heated by means of a flat tube, fastened to the side, and near to the bottom of each vessel, and introduced through an aperture into the stove. The heat of the stove affords the additional advantage of preserving in the dairy house the requisite temperature during the winter season.

"The dairy house is a stone building, consisting of three spacious apartments, for the preservation of the milk, the cream and the butter, and for the making of the butter. Two of these apartments are under ground, and arched, and properly ventilated. To the south side is attached a convenient shed, with the requisite shelves, and with a copper boiler for washing and keeping in good and sweet condition all the dairy utensils. In front is a pent house."

Jesse Buel, Esq., recommends using a boiler instead of a wooden vessel for cooking food for swine. He observes, "I have thrown by my steamer for hog food and substituted a boiler. The former consisted of a sixty gallon cask, over a potash kettle badly set. I could only work off four or five casks a day, with great labor and trouble, and the apparatus required to be luted with clay at every operation. With my new kettle, holding 30 gallons, which is a thin and beautiful casting, I have cooked eight and nine barrels in half a day, and much better than by the steam process. This food consists of small refuse potatoes, of which I have nearly 100 bushels, or 15 per cent. of my whole crop, pumpkins, and a small quantity of Indian meal. A half day's boiling serves my hog family for four or five days; and it is always kept prepared in advance. The ac-

* 14 lbs. a stone.

tual expense of fattening hogs thus, upon the refuse of the farm crop, is 50 to 75 per cent. less than feeding with dry corn.

"The economy of my apparatus consists much in setting the boiler so as to have all the advantage of the fire. The interior brick work is made to conform to the shape of the boiler, leaving an interval of four to six inches between them for the fire, round the whole exterior of the kettle, with the exception of a few inches at top, where the flange or rim rests upon the projecting bricks. Thus the boiler is not only encompassed by the flame, but the heat is augmented by radiation from the brick work. The fuel is burnt on a grate, which extends nearly to the kettle, four or five inches above the level of its bottom. My boiler being in operation while I am preparing these remarks, I have ascertained that a kettle of potatoes, with three pails of cold water, covered with boards, has been completely boiled in 18 minutes from the time they were put in, another boiling having been just previously taken out. My kettle was set by a son in his teens, without assistance, and was his first effort in masonry."

In cooking for cattle, however, when hay and other bulky articles of food are prepared by heat, steam will be found the best medium. Care should be taken to make the vessel, in which the steaming is effected, so tight that the steam cannot escape till it becomes quite hot and elastic. A cover of good weight, setting close, but capable of being raised a little by steam of high pressure, may be made to operate like a safety valve, and at the same time confine the steam till it exceeds 212 degrees, the heat of boiling water. Any food is better when cooked by steam of a high temperature, than when merely soaked in an artificial fog, not much warmer than a mist which caps the hills on a summer's morning.

Agricultural Knowledge.—We make the following extract from an excellent address before the Agricultural Society of South Carolina, in August last, by R. W. Roper, Esq.

South Carolina is emphatically an Agricultural State, and scientific information, with personal supervision, are alone necessary to develope the resources of a favored country. Every planter should endeavor to increase the stock of useful information. The improvement of Agriculture depends as well upon the operations of mind as physical exertion, the last but demonstrates what the first conceives, and this constitutes Science. Knowledge is advanced by communicating our thoughts, comparing our plans, and catching, from the most humble intellect, some idea to assist in rearing a useful structure. To insure success in this branch of information, the energies of all must be combined, societies must be formed, periodicals established, often issued, at the cheapest rates, and universally patronized. I cannot press too earnestly the benefits to be derived from well conducted Agricultural Societies. Every parish and district in the State should have one or more established within its precincts, and by reciprocal correspondence communicate the earliest information of new experiments and inventions. Visiting Committees should seek out and introduce to public notice the efforts or success of the diffident and unlearned, and encourage them to give, without fear of criticism, their practical observations, as a chart by which Science may deduce most useful inferences. Schools should be established in this State on similar principles with those of Europe. In Germany, there are a number of Forest Academies, where the principal branches taught are Forest-Botany, Mineralogy, Zoology, Chemistry, &c. by which the learner is instructed in the natural history of forests, and the mutual relations of the different kingdoms of nature. He is instructed in the mode of raising all kinds of wood, and supplying a new growth as fast as the old is taken away. Also, in Switzerland, the art of Husbandry is a branch of education, and intervals from classic study are occupied by practical illustration; and the student is taught to labor with his hoe and spade, in gardens appropriated for that purpose. And why should the scholar, who has accompanied the Mantuan bard through smoking Troy and hard fought fields, not follow when he teaches to till the earth, points to waving harvests, or would recline in pastoral scenes. No information could be a surer dependence on failure of other resources, especially in this State, which must be Agricultural, for the face of the country declares it, and no exertion, moral, physical, or political, should be neglected to develope its resources, and make them fully available. Ignorance of true principles of Husbandry has cost millions to possessors of landed estates, who, with heavy hearts, have deserted their abodes, friends and comforts, of civilized life, to seek in distant wilds those means of subsistence which art and education may have supplied at home. Of 16,000,000 acres of land comprized within the territorial limits of South Carolina, not 1,300,000 are cultivated; and barren, indeed, must be the State, where 14,700,000 acres are unimprovable. But we know that forsaken lands have been rendered productive, by more skillful proprietors, and extensive improvements made available: previous to the use of salt-mud, as a manure, many of the island plantations were considered exhausted and valueless, but now are highly estimated from their proximity to this great restorer. On soils where calcareous matter predominates, large and repeated crops of saintfoin are produced by adding certain manures, which alter and improve the soil, rendered poor from a perpetual succession of the same crops.

Raising Ducks and Turkies. — In the Agriculturist of last year, appeared two articles, one on the best mode of raising ducks, and the other on turkies. Two seasons have since passed away, and the writer of this has been enabled to test the efficacy of those directions, and, in every instance that has come under his knowledge, they have been attended with perfect success. The directions for raising ducks were to feed them on animal food and keep them dry. Individuals, who have adopted this plan, have sent to our markets from 500 to 700 ducks of the finest kinds, and they have had no diseases among them, and found no difficulty in raising them.

Two or three individuals who tried the experiment of driving their turkies, when young, to a distance from the house, where the greatest number of insects were to be found, and feeding and housing them in the manner directed in the Agriculturist, have stated that they have raised from 100 to 300 turkies, and have pronounced it to be a method which, of all others, they believed best calculated to be attended with success.—[Southern Agr.]

A Simple Remedy for the Croup.—This dangerous disorder, which has proved fatal to children, in almost every climate and situation, and which is the dread of many an anxious parent, may be subdued by the timely application of a remedy, which is not only simple, but easily obtained. As soon as the symptoms of croup appear, Scotch snuff must be applied to the throat of the child, either in the form of a plaster, or by rubbing it on the throat and chest; this can easily be done by mixing the snuff with any fat or oily substance, which makes it adhere to the skin. If applied too low on the chest, it causes vomiting; and as the application to the throat appears to occasion nausea sufficient to throw out a moisture on the skin, it is supposed that this alone has a tendency to ameliorate the disease. The writer of this has seen the most beneficial results from the timely application of this simple remedy, and but recently witnessed its efficacy in the case of a child five years old, subject to this alarming disease from its infancy. The family were called up at midnight, and found the child laboring under all the distressing symptoms of croup, accompanied by considerable fever. A plaster of Scotch snuff was immediately prepared, by mixing it with some promatum which was at hand, and spreading it on a bit of cloth cut to extend partly round the throat, and a little over the chest. This was immediately applied, but as the parents were too anxious to rely on this remedy alone, they sent for a physician, but, by the time he arrived, the disease was greatly ameliorated, the difficulty of breathing having ceased, and a considerable moisture appearing on the skin, and the cough and restlessness also greatly relieved. In this stage of the disease, the physician recommended the feet to be bathed in warm water, and a dose of castor oil to be administered; the child was then put to bed, became quite composed, and by the morning all symptoms of croup had disappeared.—[Southern Agriculturist.]

Chronic Rheumatism.—We are not ready to add to the number of the remedies which have been prescribed for this painful disease, without a certainty that such addition will be valuable in practice. This certainty we are convinced will attend the remedy it is the object of this article to bring before the profession. It is a mixture of equal parts of the balsam of sulphur and spirit of turpentine. Six drops of this mixture may be given morning and evening, and the dose increased two drops a day until it produces stranguary, when the dose should be diminished a little and continued until the disease is removed. We have been recently informed of the good effects of this mixture in a great number of instances, and one very remarkable case has fallen within our notice, in which the disease in its worst form vanished before it in a few weeks, although the patient had been long using without advantage the usual and other most powerful remedies for this troublesome and painful malady.—[Bos. Med. Intel.]

Cure for Weak Eyes.—Take a small lump of white copperas, say about the size of a pea; put it in a small phial, holding about two ounces of water: carry this in the pocket, and occasionally taking out the cork, turn the phial upon the finger's end, and thus bathe the eyes. This will positively effect a real cure in a short time.

Apparatus for Analysing Marl, and the Carbonates in General. [From the Farmers' Register.]

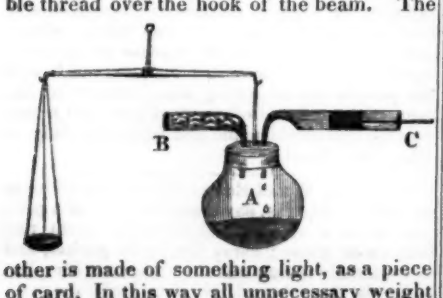
William and Mary College, June 27, 1834.

The apparatus which I am about to describe is intended to give greater accuracy and facility to the usual process for determining the quantity of carbonic in marl, or in any of the carbonates. By the common method, the two vessels containing severally the marl and the muriatic acid are placed in one of the scales of a delicate balance, and there counterpoised by weights put into the other scale. The acid is then poured upon the marl, and after all the carbonic acid has been discharged, the equilibrium is restored by adding weights to one, or abstracting them from the other scale. In principle, this method is entirely free from objection, but as usually conducted, it cannot be relied upon as accurate. This want of precision arises in the first place from the escape of aqueous vapor, along with the carbonic acid which is discharged, thus making a greater weight necessary for restoring the equilibrium than is due to the quantity of carbonic acid which has escaped —and secondly, from the greater weight of the vessels containing the marl and acid impairing the sensibility of the balance, and thus rendering it impossible to estimate the carbonic acid to small fractions of a grain. The first of these objections has long been obviated in the chemical analysis of the carbonates, by causing the gas as it escapes to pass through a tube containing dried muriate of lime; and the latter has been in some measure removed by a contrivance of the great practical chemist Rose; which, however, as it is inconvenient and uncertain in the manipulation, I shall not here describe.

The apparatus which I have devised is, I think, free from these objections, and enables the operator to proceed with great accuracy and despatch. It has the advantage of being very easily constructed, and of being used with a balance that can be procured at a very moderate price. Moreover, the quantity of marl which is necessary for experiment in no case exceeding ten grains, specimens for analysis may very easily be forwarded by letter.

The balance which I use with this apparatus is a small goldsmith's balance, such as may be procured for a few dollars in New-York. It is very light, and turns, when unloaded, with the one hundredth of a grain. My set of weights, obtained from Millington, in Philadelphia, extends to tenths and hundredths of the grain.

The accompanying figure will convey a distinct idea of the apparatus and mode of using it. One of the scales is removed, to admit of suspending the apparatus by a double thread over the hook of the beam. The



other is made of something light, as a piece of card. In this way all unnecessary weight upon the beam is avoided, and its sensibility preserved.

A is a light bulb of glass, blown very thin from a common piece of tube, and about one inch in diameter. A cork is fitted to its mouth, and through this the tapered ends of the bent glass tubes, B and C, are passed air tight; the extremity of the latter extending some distance into the vessel. The tube B, through which the gas escapes, is filled with fragments of muriate of lime. The tube C, which contains the muriatic acid, is furnished with a light piston of cork or cotton, in the centre of which is fixed a rod or handle, made of a small stiff straw. This instrument, when charged with marl and acid, does not weigh more than 120 grains. The whole load of the beam is therefore 240 grains, and it is still sensible to the one hundredth of a grain.

The mode of proceeding with the analysis is as follows. Five or ten grains of the finely powdered marl is introduced into the vessel A, and then two or three drops of water added, to assist the diffusion of the acid. The small end of the tube C, now removed from the cork, is dipped into some muriatic acid in a wine glass, and the piston moved backwards and forwards until the necessary quantity of acid has been drawn in. The tube is then replaced in the cork, and in this state the instrument is counterpoised by weights in the opposite scale. The piston being then gradually forced in, the acid is injected drop by drop upon the marl, and the gas escapes by the tube B, depositing the aqueous vapor in its passage, on the muriate of lime. Allowing the apparatus to rest until the gas has entirely escaped, and the decomposition is complete, the equilibrium is restored by placing weights upon the clear top of the cork, or by removing weights from the scale. In this way the weight of the disengaged gas is accurately determined, and the proportion of carbonate of lime thence computed.

An analysis of a specimen of marl from James City, just completed, will serve as an illustration of the method. Ten grains of the finely powdered marl were introduced with a little water into the vessel A; the instrument was then charged and equipoised. The acid being injected, the whole was allowed to rest for an hour. The weight lost was 2·91 grains. Increasing this in the ratio of 44 to 100, gives 6·61 grains of carbonate of lime in the 10 grains of marl —or almost precisely 66 per cent.

The frequent calls upon me for the analysis of specimens of marl, first led me to the construction of this apparatus, and I have since found it so convenient and accurate, that I can recommend its adoption to such of your readers as may have a taste for chemical inquiries connected with agriculture. Any ordinary worker in glass will construct the instrument, and skill in manipulating with it may be soon and easily acquired.

WM. B. ROGERS.

[The farmers who are using marl will be greatly indebted to Professor Rogers for the convenient and cheap little apparatus above described—which, judging from his description, not only furnishes the cheapest and most convenient, but likewise the most accurate mode of analysing calcareous manures. It may be easily constructed by any worker in glass—so easily, indeed, that Mr. Rogers made his own by the heat of an Argand lamp, using a few common glass tubes as materials. Every farmer who uses calcareous manures ought to have some means for testing their strength, and this seems to be completely within the power of all to obtain, and to make use of, with very little attention. But, though the process as above described is sufficiently plain to all who have the slightest knowledge of the chemical properties of the substances used, it may appear unintelligible to others; and therefore we hope that the following explanations may be pardoned by those to whom they are altogether useless.

The principle upon which the apparatus works is the same as that of the more expensive and complicated apparatus of Davy, (described in his Agricultural Chemistry,) which we have heretofore considered the best—that is, by separating and ascertaining the weight of the carbonic acid combined with the lime of the manure. Every hundred grains of calcareous earth, or carbonate of lime, is composed always of similar proportions of lime and of carbonic acid—which proportions, by weight, are 56 parts of lime, and 44 of carbonic acid. Of course, if we know how much weight is lost in 100 grains of earth, partly of carbonate of lime, (as marl,) by driving off its carbonic acid, the rule of proportion will show what was the amount of carbonate of lime contained in the sample of earth.

When the muriatic acid reaches the earth in the bulb, it immediately combines with the lime by its greater attraction, and the weaker carbonic acid is disengaged in the form of gas, and escapes into the air through the tube containing the dry muriate of lime —which substance attracts moisture so powerfully as to retain all that might otherwise pass out with the gas. The same muriate of lime will serve for many experiments, as by being heated in the tube its dryness is restored previous to every trial. This salt is formed by the combination of muriatic acid with lime, and therefore every experimenter may provide it for himself by filtering and evaporating the fluid left in this process of decomposing carbonate of lime.—[Ed. Far. Register.]

COOKING POTATOES.—Of all the good things which nature produces, through the patient industry of farmers, there is nothing which is so agreeable to the palate as the potato, nor any one vegetable so universally esteemed; yet this is so frequently rendered unpalatable by the manner of cooking it, that but comparatively few are acquainted with the real flavor of this esculent root. Lovers of mealy potatoes will do well to attend to the following method, communicated to us by a lady of this town, whereby potatoes a year old may be rendered as delicious as new ones boiled in the common manner. Peel them, put them into cold water, and let them remain two or three hours; then boil them in water which has been salted, observing that it boils when they are put in; pour off the water when they are done, shake them well for a short time, put them on the fire again, and at the expiration of ten or fifteen minutes they will be ready for the table.—[Lancaster Gazette.]

WHOLESOME MEAT.—All meats, say writers on medical subjects, are best when the animal arrives at maturity. Hence, to delicate persons, chickens, lamb, veal, or pig, are not near so wholesome or nutritive as beef, fowl, mutton, and pork.

On promoting the Collection and Diffusion of Useful Knowledge.—It is a saying sanctioned by the authority of Bacon, that "*knowledge is power.*" Of all the various sorts of power, enumerated by that great philosopher, this seems by far the most important. What gives one man any real superiority over another, but the knowledge he possesses? What enables some individuals to produce abundant harvests,—to carry on a prosperous commerce,—to establish successful manufactures,—to excel in mechanism, or any other useful art, but the acquisition and judicious application of that knowledge in which others are deficient?

That the power and prosperity of a country depend on the diffusion of useful knowledge can hardly be questioned; and there is, probably, no art, in which a variety of knowledge is of more essential importance, than in that of agriculture. The extent of information necessary to bring it to any thing like perfection is far greater than is generally supposed. To preserve the fertility of the soil—to free it from superfluous moisture—to cultivate it to the greatest advantage—to raise its productions at the least expense—to procure the best instruments of husbandry—to select the stock likely to be the most profitable—to feed them in the most judicious manner, and to bring them to the most advantageous markets—to secure the harvest, even in the most unpropitious seasons—to separate the grain from the straw with economy and success—and to perform all the other operations of agriculture in the most judicious modes, require a greater extent and variety of knowledge, than might, at first view, be judged requisite.

But though a general knowledge of agriculture may be diffused over a great country, it is found by experience that it cannot be materially improved, unless by comparing the various practices which subsist, in different parts of the same kingdom. One district has been led to pay a peculiar and successful attention to one branch of husbandry, or, by a fortunate accident, some important discovery has been made in it, while other districts excel in other particulars of equal importance. Mutual benefit is derived from the communication of such local practices. Of this, the improved modes of paring by Elkington — the warping of land on the banks of the Humber — the drilling of turnips and potatoes in the northern part of the island — and the more general use of the threshing-mill, and various other articles of agricultural machinery, may be cited as examples.

The advantages that may be derived, from the result of those inquiries which have been carried on by the Board of Agriculture, in so far as regards the culture of arable land, may thus be briefly stated. The means have been explained, by which, in fertile districts, aud in propitious seasons, the farmer may, on an average, confidently expect to reap from 32 to 40 bushels of wheat, from 42 to 50 bushels of barley, from 52 to 64 bushels of oats, and from 25 to 32 bushels of beans, Winchester measure, per statute acre. As to green crops, thirty tons of turnips, three tons of clover, and from eight to ten tons of potatoes, per statute acre, may be confidently relied on. In favorable seasons, the crops are still more abundant; but even these average ones, spread over a large proportion of the united kingdom, would produce more solid wealth than foreign commerce could ever furnish.—[Sinclair.]

Kreosot.—A great discovery in Chemistry has lately been made by Dr. Richenback, of Germany; he having succeeded in extracting from tar and smoke a hitherto unknown substance, which he calls Kreosot, (flesh preserver.)

This substance possesses the property of resisting putrefaction, in a most eminent degree; and when diluted with water, fresh slaughtered meat, after having been immersed in it for a few minutes, may be kept in the open air and in the hottest weather, for any length of time, without becoming in the least affected.

This fact led several eminent physicians to experiment with it, in the treatment of human diseases, applying it both internally and externally, in which they have been crowned with the most striking success.

People afflicted with the horrid disease of Cancer, after having been despaired of by the most skilful physicians, have been completely cured by Kreosot.

For wounds and sores in general, it has been found the best remedy known: and is particularly recommended in surgical operations, as it prevents inflammation, and stops the most excessive bleeding almost instantly.—[Phil. U. S. Gaz.]

Horses' Sight.—People in general turn a horse's head to a bright light to examine his eyes. You can know very little by this method what sort of an eye a horse has, unless it be a very defective one. You must examine the eye first when the horse stands with his head to the manger. Look carefully at the pupil of the eye in a horse, it is of an oblong form; carry the size of the pupil in your mind, and then turn the horse about, bringing him to the light; if the pupil of the eye contracts, appears much smaller than it was in the dark light, then you may be sure the horse has a strong good eye; but provided the pupil remains nearly the same size as it appeared in the darker light, then the horse has a weak eye, therefore have nothing to do with him. There are contracting and dilating muscles in the eye which will plainly show you in what state the eye is, whether it be a stronger or a weaker one.—[Raleigh Star.]

Stock.—I do not think that farmers in this vicinity pay that attention to improving the different breeds of their neat cattle which it would be profitable for them to bestow. And to what is this owing? Is it not to the sceptical conclusions which they have adopted concerning the practicability of the subject? The idea is prevalent that the breed is nothing, feed every thing; that this in fact is all that is necessary to make fine animals. But this is a very mistaken notion, and one which ought to be exploded. Good keeping is an excellent thing, it is readily granted; but it was never known to reduce bone or offal, or to produce any radical change in the animal physiology. It may serve to perfect the nature, such as it is, and this is all it can do; change it, it never can.

Those who affirm that their disbelief in this matter is derived from nothing less than their own experience, cannot, to say the least, I think, have enjoyed the benefit of an enlightened experience. Their mode of operations must have been defective, and the error probably lies in not conforming their practice to a rule, the observance of which in every particular is necessary to ensure complete success. It consists simply *in breeding from dams and sires of distinct blood, who possess themselves, and are descended from ancestors who possessed before them, the peculiar attributes and properties which it is sought to perpetuate in the progeny.* An adherence to this rule, so far as it is practicable, would be productive of results with which, I am persuaded, farmers would have no reason to be dissatisfied. It is important always to know what is the proper course to be pursued; and in the present case, such knowledge may serve to guard us from two very common errors, viz. first, that of breeding from near relatives, according to the "in and in" system, as it is called; and secondly, that of disregarding ancestry, and forming our expectations of the character of the progeny solely from that of the parents.

I cannot but think, were all farmers hereafter carefully to eschew those fatal errors, and to regulate their practice according to the foregoing suggestions, we might confidently anticipate a speedy arrival of the period when there would be no longer occasion for the old saw, "a good cow may have a bad calf." H. West Bridgewater.—[Old Colony Democrat.]

Elephants breakfast on Apples.—A few days ago, two elephants, belonging to a menagerie that has been in this city, were passing along the road in the vicinity of Middletown, when they saw a most inviting heap of apples in an orchard. In an instant the fence was prostrated by the huge animals, and without loss of time they regaled themselves on fruit to their perfect satisfaction. We have not heard it stated how great was the quantity of apples they consumed, but it is said that the elephants would not be driven away till they had appeased their exceedingly delicate *little* stomachs. Such visiters, we apprehend, would be any thing but agreeable to most of our farmers, particularly when the whole stock of a farmer's winter apples, as well as those for cider, would be devoured at one breakfast, by a couple of these Asiatic visiters.—[Middletown Advocate, Ct.]

Asclepias Syriaca.—A new and beautiful material, consisting of the *fibre* of the external cortex of the Asclepias Syriaca, has within a few years been discovered in this town, and the method of manufacturing the same, which together have resulted in an original manufacture. Some specimens of this being recently exhibited at the rooms of the Natural History Society, were imagined by some, and unfortunately it was so published in the journals of the day, to consist partly of the *wings* or *arms* of the seeds; which misapprehension appears to call for some elucidation of the subject. The specimen articles thus exhibited were all manufactured *exclusively* of the *fibre* of the exterior bark of the stem of the above named plant, which being subjected to various processes, various results are obtained—forming apparently different textures of the manufactured articles. One process produces a substance for a beautiful and substantial paper; another for fancy articles of almost every description; and another for a floss which may compare with the finest silk. The *fibre* is *patented*, but the wings of the seeds

enter not into the grant, not being claimed by the patentee as forming any part of the discovery.—[Salem Gazette.]

ORNAMENTAL TREE SOCIETY.—The Middlesex Whig contains a report of the Concord Ornamental Tree Society, the objects of which are to set out trees in public squares, avenues, and roads. We deem associations of this kind of very great usefulness.

GRAPES, &c. IN MAINE.—James McArthur, Esq. of Limington, has raised the present season, from vines planted in his garden in 1830, *sixteen bushels* of the Isabella, Catawba, and Elsingburgh Grapes. It is ascertained beyond a doubt, that the climate of this Sate is perfectly congenial to the cultivation of the above varieties of grapes, and that wine of an excellent quality may be manufactured from them. With proper attention, our farmers may make their own wine, and have it of far better quality than is generally imported from other countries.

Mr. McA. has an excellent garden, and raises most all the variety of luxuries which can be cultivated in this part of the country. We were in it the other day, and had a fine feast of his grapes, peaches, &c. and can attest to their good qualities. While partaking of these good things we were forcibly reminded of Mr. Graham, who a few months since, in one of his lectures on vegetable diet, made our mouth water in describing the delicious taste of a fine ripe peach when picked from the tree and immediately eaten, and we may say we were not at all disappointed in eating of this fruit, for the taste was fully equal to his description of it.—[Maine Recorder.]

RIBBON GRASS.—Sir: I have seen, in two of your back numbers, mention made of the *Phalaris Americana*, or Ribbon Grass of our gardens. I am glad to see that grass brought into notice—I have long thought it would become an article of considerable interest to the farmer and gardener, if it was cultivatnd as a common grass. My attention was first directed to it by an accident, which, by the by, is the way in which most discoveries in agriculture are effected—and as it has no claims to the merit of "book farming," it may possibly attract some attention from your casual readers.

The circumstance was this: I was at one of my neighbors, who kept a very handsome garden that was well set off with flowers. Among many other things, there was a fine bed of ribbon grass, in one corner of the garden, nearly as high as the paling which surrounded it.

It so happened that I hitched my horse to the corner of the fence directly in contact with the *Phalaris*. I had not been long seated before there was a great hue and cry raised, and I was informed my horse had broken his bridle and had torn down the garden fence. It appeared he had most lavishly helped himself to the ribbon grass. My particular friend, the lady of the house, looked rather cross-eyed at the horse, on perceiving the destruction he had made in her parterre; the gentleman seemed much more impressed with the importance of the discovery, that the grass was so well relished by the animal,—a circumstance he had never suspected,—than he was by the defacing of a very pretty spot. I was likewise gratified with an agricultural discovery, and the horse seemed really to be more gratified than either of us: so that the lady seeing three to one against her, we came off without much of a lecture for that time. This grass had but few seed-stalks, which were about four feet high, and the leaves, if straightened out, would have been nearly or quite as high. I have no doubt, but an acre sowed as that bed was would yield six tons of good hay, and if we can judge from this instance it, will be much relished by animals of all kinds.

I am disposed to think this grass is not very particular in regard to soil; it seems by what has been said, in your former paper, that a wet soil suits it very well; but in the instance of which I have spoken, it was growing in a light sandy soil; and from all I have seen of it, as far as my recollection serves me, it has flourished best in that kind of soil. It is in this respect quite a rival of the gama grass. I can hardly imagine a more beautiful appearance than a field would present, if well set with this grass. A cow could not avoid giving good butter, if kept on such beautiful pasture. I am, Sir, a lover of GOOD BUTTER.—[Farmer and Gardener.]

GOODS TRANSPORTED FROM NEW-ORLEANS.—The Baltimore American remarks that previously to the introduction of steamboats on the Mississippi, the amount of goods transported between New-Orleans and the towns of Louisville and Cincinnati was only two thousand tons, carried in barges averaging one hundred tons burthen, and making only one trip within the year. The amount estimated to be at present is upwards of one million of tons, the tonnage of the steamboats employed in this portion of the trade on the Ohio and Mississippi alone being 8400, and each boat making many trips in a year. This is truly a most extraordinary increase of trade in less than twenty years, steamboats having been first introduced on the Mississippi in 1817.—[New-Bedford Mercury.]

The Dry Rot.

BALTIMORE, Oct. 18, 1834.

H. NILES, ESQ.:

Dear Sir,—I send you herewith a copy of a communication that I caused to be placed in the Navy Department at Washington last winter, which I wish you to publish in your useful Register for the benefit of those who may see proper to make use of it, and oblige, dear Sir, your obedient servant,

WM. PATTERSON.

DRY ROT.—The dry rot in ships of war and merchant vessels has long been a subject of serious and anxious concern. Many plans for their preservation from this evil have been suggested and tried without success. Having, for a long series of years, had considerable experience as a constructor, owner, and employer of merchant vessels, and believing that I have succeeded, at least I have succeeded to my own satisfaction, in preserving ships of this description as long as they are likely to be useful or profitable—I therefore feel prompted to unfold my plans and my experience to the Navy Department.

In order that those plans and that experience may be better understood, I shall commence with my situation and observations in early life.

In the year 1766, at a very early age, I was placed in the counting-house of a shipping merchant in Philadelphia, which city was, at that time, celebrated, perhaps beyond any other place in America, for fine vessels. My employers were largely engaged in the shipping business—they built a ship or vessel every year or two; here I had a favorable opportunity of seeing and becoming familiar with the building, equipage and employing of merchant sea-vessels. Owing to these circumstances, I acquired so great an attachment and fondness for vessels that they have adhered to me through a long life. Then, as now, the speedy decay of ships was a matter of serious consideration, and every scheme for their preservation that was suggested was tried, but without answering any useful purpose. Some merchants, in building vessels, allowing their frames, when raised, to remain for a length of time on the stocks, exposed to the weather; others smeared the timbers with fish oil; and others again used oil and paint; all of these experiments were attended with little or no success. In one instance, I knew the frame of a vessel to be plied with fish oil throughout an entire summer; and, in the fall of the year, when she was about to be finished, it was discovered that the oil had penetrated the timbers more than a quarter or half of an inch; this proved to be little or no protection, and the experiment was abandoned. In another instance, I knew of a very fine vessel built, (for a Charleston packet,) with so much care that she required no caulking nor repairs for four years; at the end of that time, when she was carried into dock to be caulked, she was found to be so totally destroyed by the dry rot as to be unworthy of repair, and was broken up. Her rapid decay was attributed to the unusual care which had been taken of her whilst running.

Some few, even at that early period, made use of salt; but a great prejudice existed against this mode, owing to the belief that it corroded the iron fastenings, (copper was not then used in fastening our vessels,) and the apprehension that the dampness in a salted vessel might be injurious to the cargo.

I became a ship owner in the year 1773, and one of my first considerations was, how should I preserve that description of property from speedy decay? Observing that timber, when sunk deep in swamps or in the water, lasted for ages, I concluded that exclusion from the air, and saturating the pores of the wood with moisture, must be the true secret for its preservation. Reflecting on this circumstance, and perceiving that the wooden floors of ware-houses used for the storage of Bay salt were always damp in moist weather, I was led to the conclusion that Bay salt, properly applied, must have the effect of preserving timber. Under this impression, I adopted the following plan with all the vessels I have built from that time till the present, (a period of more than sixty years, as I am still a ship owner;) while building, when the bends and bottom planks are on, and before delling, I have caused three sets of stoppers to be placed fore and aft between all the timbers to keep the salt in its place. The first tier of stoppers are placed at the floor heads, the second immediately below the lower deck beams, and the third between decks, just above the air streak, common in all double decked vessels. Air streaks are left above the first and second tiers of

stoppers for the purpose of adding more salt as the previous supplies of that article settle or are dissolved. Just before finishing the ceiling of the vessel, the salt is filled in among all of the timbers from the lowest tier of stoppers to the upper deck—taking care that the salt in the upper tier is well rammed down, (if wetted so much the better,) for, after the plank-shears are laid, and secured in their places, the salt cannot be re-placed without incurring too much trouble and expense.

Having experienced great difficulty in preserving large timbers, (especially transoms,) above light water mark, I have of late years had such pieces bored through the centre with an auger of two inches or two inches and a half in diameter. These holes are filled with wetted salt, and then plugged at both ends before placing the timbers in the vessel.

In the forward and after parts of the vessel, where the timbers are so close together that salt cannot be introduced among them, I have found it necessary to incase the timber, and confine the salt in this way. In one instance I had all of the knees, and the steps of the masts, in a fine ship, boxed in and filled with salt; this answered a very good purpose, but it is too troublesome in merchant vessels.

I have not only sailed my vessels in the manner pointed out above, in the first instance, but I have had them examined carefully every two or three years, and where the salt has wasted or settled, a fresh supply has been added.

In all my experience I have never found a defective timber in vessels thus prepared, and thus taken care of, and I am persuaded that the dry rot may be entirely prevented by adopting the above precautions. As a proof of the good effects of the above mode, I will add, that I have two vessels now running, which are perfectly sound and trustworthy; one of them is 31 years old, and the other 25, and the only repairs that have been given to their hulls were the renewal of the waist planks of both, and the quarter deck of one of them. This was not owing to the decay of the plank, but to the circumstance of its being fastened with iron. The corrosion of the iron caused openings where it passed through the wood: had copper fastenings been used, the decays would not have happened. I think all vessels of war ought to be secured with copper fastenings, and no iron ought to be used when it can possibly be avoided.

I have seldom used the live oak in the construction of vessels, as it is hard to work, and too heavy for merchant ships: I greatly prefer the timber of our bay—white oak, locust, cedar, and yellow pine. I use the white oak for the frames and for plank from the keel up to and including the bends. From the bends to the upper deck, I form the frame of locust and red cedar, an equal number of pieces of either kind alternately distributed. The sides, quick-work, decks, upper beams, and carlins, are formed of the heart of yellow pine. Latterly I have fastened the sides and decks with copper.

My vessels have generally been employed on long voyages to the East Indies and South America; and to guard against delay and accidents on such voyages, I have fitted them out in the following manner: They are copper fastened—then sheathed with yellow pine boards one inch in thickness, put on with copper nails of two inches or two inches and a half in length; a layer of strong paper dipped in tar is placed between the pine boards and the bottom of the vessel; and another layer of paper, prepared in like manner, is placed between the pine boards and the copper. The copper sheathing that I use weighs from 28 to 32 ounces the square foot. In this way the vessel may be said to have five bottoms—two of wood, two of paper, and one of copper. They are so tight, that it is necessary to have cocks through which water may be introduced into the hold to keep the vessel sweet. An additional advantage is, that they may be run with safety two or three years longer than they could do if they were coppered on a single bottom of wood.

One of my vessels ran 17 years, and wore out three sets of sheathing copper before I removed the pine boards; fearing that the main bottom might require some attention in consequence of the decay of the oakum, I stripped off the sheathing boards, and discovered to my surprize that the bottom and seams were in perfectly good order—indeed, it appears as if the water had never penetrated to the main bottom, and that the sheathing of wood might have remained on with safety for many years longer.

The year before the breaking out of the late war with Great Britain, I commenced building a fine vessel, and had her frame raised, her bends on, and bottom planked, when I determined to proceed no farther. I erected a shed over the vessel, under which she remained four years before I concluded to finish her. All possible care was taken of her, yet some of the large pieces of timber were found defective, especially the transoms—timbers 18 inches square were found to be entirely destroyed by dry rot, although the interior exhibited no symptoms of unsoundness. It was owing to this circumstance that I resorted to the above cited plan of boring the large timbers and filling the holes with salt.

For the preservation of vessels of war, the method which I have pointed out, and which I have pursued, would be of great consequence: it would save millions annually to those governments which from choice or from necessity keep fleets in commission.

The only difficulty in the way of its introduction arises from the prejudice against the use of salt, under the impression that it causes too great a degree of moisture in the places allotted for the accommodation of the officers and crews. I have experienced no inconvenience in this respect, when the cabins are lined with dry boards, attached to the inner ceiling; nor have I in any instance found that any danger has happened to the cargoes in consequence of the moisture.

To overcome any inconvenience that might be apprehended, it is only necessary to prepare the accommodations for the officers and men, in ships of war, by fastening strips of plank an inch thick, up and down, to the sides of which strips a sheathing of dry boards can be attached. This will effectually prevent the escape of the moisture. The northern and eastern fronts of our country houses are sometimes secured in this manner from north-east storms.

I have mentioned Bay salt as the only kind that ought to be used for the preservation of vessels, owing to its quality of giving in moist weather—dry stoved salt does not possess this quality, and is therefore unsuitable.

I have had some experience with fast sailing vessels, vulgarly called *Baltimore clippers*, and I have witnessed their rise and progress in two wars. Some of them have performed wonders—it is only necessary to say, that they require great care and judgment in their construction and equipment, and that they should be commanded by men trained in their management.

WILLIAM PATTERSON.

Baltimore, Feb. 26, 1834.

COALFIELD STEMS.—This term is applied to vegetable remains found in coal beds. H. T. M. Witham, Esq. of Edinburgh, is pursuing an interesting series of experiments upon these preserved vegetables, and will feel greatly indebted to gentlemen in this country, who will forward to his address any such specimens, found either in bituminous or anthracite coal mines of the United States.—[Scientific Tracts.]

LANDSCAPE SCENERY—*Highclere.*—At this season of the year, when even the beauties depicted in the following lines are gone, much is to be observed and studied in reference to landscape scenery.

THE FADING OF THE WOODS.

By Wm. Howitt.

Splendor is on the bough!
The withering leaves fall fast;
Yet wilder beauty crowns the forest now,
Than through the summer past.

A more resplendent blaze,
Of rich and radiant hues,
Gleams through the autumn haze,
Than 'mid the summer dews.

So is it nature loves
In all her power to part;
So with her passing splendor moves
The severing human heart.

Calmy, through pleasant years,
We love some kindred mind;
But 'tis only through our parting tears
Its full delights we find.

Then, how in form and face,
In every act and tone,
Beam forth the tenderness and grace
That melt us and are flown!

Every owner of property should, during the season of defoliation, make careful and frequent observations from not only all parts of his premises, but from the approaches to his dwelling, and from places where it shows to the best advantage. He will, particularly by comparing the present extent of scenery with that of summer, soon perceive what trees are to be removed and trimmed and where others are to be placed. There are many residences in the country that show beautifully and conspicuously in winter, and command interesting and striking views, but in summer they are all completely concealed by the foliage; and some of these very places, for want of taste and neatness about the dwelling, assume, even when nature is all beauty and splendor, a forbidding aspect.

The following, from Loudon's Magazine, is well worthy of perusal. It shows particularly, on the part of the father, the good effects of consulting one's own taste and judgment, and of long perseverance.

In proceeding from Newbury to Highclere, the road passes through a richly cultivated country, having in some places a parklike character. In one part, the effect of the trees and turf, on both sides of the road, lead the traveller to believe that he is passing through a park. Advancing a little, we come to a mansion in

tended for Gothic; and we cannot help feeling regret that a builder of so little taste should have been at work in such a scene. The road continues in rather a grand style for a cross country road, passing a curious corner clump of larch trees, which, we were informed, constitute the remains of a nursery, and which are now 50 ft. high: these trees, small and naked in the stem, look like a gigantic crop of oats, rather than larches; and present a striking example of how much the character of a tree may be changed by the circumstances in which it is grown. Shortly beyond these larches, and apparently forming the termination of a straight line of the road, appears the arch-way, which is the main entrance into the park of Highclere. The general effect is exceedingly good; but the architectural details are objectionable, pilasters being used, not at the angles as supports, but in the middle of the wall as ornaments. After passing the arch, we find that the first part of the approach road leads through a thick wood of oaks, hollies, and beeches; as we advance, the eye penetrates to a deep and wild glen on the right; shortly after, the scenery opens to the day, and a sequestered glade, of three or four acres, surrounded by wood, appears to the left: advancing onwards, the wood thickens, and gradually approaches close to the road on the left, while the scenery opens to the right; and, the road making a gentle turn, the upper part of a circular temple, surrounded by a colonade and surmounted by a dome, appears on a knoll at a short distance across a woody vale. The road advancing among park scenery, in which exotic trees, such as hoary-leaved limes, cedars, &c., begin to be introduced, we see the same temple crowning the summit of a bold promontory, to which we gradually ascend. The effect of this temple is exceedingly good, not only from the approach, but from every other part of the grounds. Its architecture is faulty, inasmuch as its colonade is interrupted, and the wall which supports its dome is not shown above the entablature; but these faults are lost in the feeling of gratification experienced on observing such an object placed in so fitting a situation. Pausing at this temple and looking from it to the lower grounds, we observe a large sheet of water losing itself in three directions among well-tufted woods. The stranger may now be considered as initiated in the charms of the place, and he advances forwards expecting the continuation of what he has hitherto experienced, new beauties at every step. Nor is he disappointed; for, on the one hand, Milford Water and varied views of rich distant scenery supply the most ennobling landscapes; while, on the other, the two striking hills which form the boundary of the park are leading features. In addition to these objects, the house is seen for the first time when we are about three quarters of a mile distant from it; it is soon lost again and we do not catch another glimpse of it till we are very near it. Its first appearance is exceedingly grand, standing on an elevated table land, backed by the two hills before mentioned, and commanding a most extensive range of distant country in front. All that we shall farther say of the approach is that the wood on each side of it is disposed so admirably that there is not a tree we could wish to alter. The prominences and recesses of the masses correspond with the elevations and declivities of the surface in some places, thus following up and increasing the variety indicated by nature; while in others they are found on declivities, so as to create variety and intricacy where none naturally existed. There is scarcely a point along the whole of this approach at which an artist might not stop and sketch a landscape that would be well-proportioned in its great component parts; and at least harmonious, if not striking, in its details. Arriving at the pleasure-ground, we discovered that the house, the road to it, and some of its accompaniments, are unfinished; and, therefore, we shall not consider them as subjects of criticism. The mansion-house, which was much altered within, and entirely cased with Bath stone without, by the late earl, who died in the spring of the year 1833, leaving it unfinished, is a square building showing three facades, each about 110 ft. in extent of frontage. The style of architecture adopted is the Grecian Ionic as used in the Erectheum at Athens. The casing with Bath stone we think a needless expense, when it is known that walls of brick, covered with Roman cement, are much stronger and much more durable than any wall of brick conjointly with stone. The elevations of the three sides nearly completed are plain and unobjectionable; with the exception of double pilasters at the angles, instead of returned ones, which does away with the idea of pilasters as representations of pillars of support. The chimney tops are also much too low, and very unarchitectural in their forms. The terrace basement is wanting; but this, with various other appendages, will no doubt be added before the place is completed. In the interior are some good-sized rooms, particularly the library. Notwithstanding all this, we are of opinion, that, to produce a house suitable to the situation, the cheapest and best way would have been to pull the whole down and rebuild it. The views from the house on the entrance front are singularly grand. To the right, they command the park scenery, with its high hilly outline of wood as the boundary, and the temple beforementioned seen rising from a wooded valley. To the left lies the valley of the Kennet, several miles in width; a rich hilly corn country rising beyond. The principal view from the lawn front forms a striking contrast to those already mentioned. In this view we look down to a smooth grassy hollow, and up to the wild woods of Sidon Hill. To the left of this, the Beacon Hill, with its bold outline and bare surface, the latter partially concealed by a wooded eminence rising from the valley right before it, forms a fine contrast to the rich wooded scenery of Sidon. This last mentioned hill is ascended by a spiral drive, partly open, and partly wooded, which terminates unexpectedly in a triumphal arch, through which the eye looks down on the house, the pleasure ground, and the whole park, as on a map. The substratum of this hill being chalk, the turf has the smooth character belonging to the downs or pastures of chalky districts; and this circumstance, together with the wild manner in which sloe thorns, junipers, and other native shrubs, have risen upon it, forms a remarkable contrast to the smooth polish of the pleasure-ground, and its groups of rhododendrons and magnolias below. From the east front of the house is seen, within the pleasure-ground, upon a raised platform, a very handsome Palladian temple, roofed and having a floor, but open on all sides. It is a most impressive and delightful object, and is in correct architecture, though now somewhat out of repair. This temple (like the circular one on the border of the approach road) is seen from many points of view in the grounds, and always with excellent effect.

"The beauties of this place are entirely the creation of the last two Earls of Caernarvon, father and son. When Henry George, the first Earl of Caernarvon of the Herbert family, succeeded his uncle in 1769, the place consisted of a small pleasure-ground on two sides (the east and south) of the mansion house, and a long avenue of beech trees, included between two quickset hedges, which connected the pleasure-ground with Sidon Hill. This hill, which is now covered with the most luxuriant vegetation, had then only five beech trees and a few ash and oak. To the north of the house a series of enclosed fields and a rabbit warren extended to Milford Water, then subdivided into three ponds, with the natural beech wood before-mentioned upon its longest side. Before his improvements were commenced, Lord Caernarvon called in the assistance of the celebrated Brown, whose plan is still preserved in the mansion at Highclere, though it was not followed. It serves to show the great superiority which a proprietor of cultivated taste, who resides upon his demesne, and makes himself master of its capabilities, will always possess over the professional landscape-gardener, taking a transient view, and forming his plan upon undigested data and imperfect knowledge of local details. Lord Caernarvon began his operations by partly destroying the avenue leading to Sidon Hill, throwing down its boundary hedges and laying down the arable fields in grass on its right and left; thus including Sidon Hill within the park, and extending the latter up to the foot of Beacon Hill, now apparently, though not actually, within it. Then turning his attention northwards, the park was carried over all the fields and rabbit warren between the mansion-house and Milford Water; which last, having its three subdivisions formed into one lake, was, with its adjoining woods, thrown also into the enclosed grounds. Very extensive plantations, stretching from the natural beech wood, along the eastern side of the park, and forming a rich woodland boundary, next occupied Lord Caernarvon's attention. After this, his planting operations upon a large scale were carried to the northwards: Dunsmere Water, in short, a multitude of operations, followed; every successive year producing some extension or developement of his original plans, which were not only pursued with unabated activity during his own life, but were continued by his son, the late Earl of Caernarvon, with equal ardor. A curious memorandum book was kept by the first Earl of Caernarvon [which has been shown to us.] It records many interesting facts connected with his improvements, chronicles the planting and progress of his favorite trees, gives the dates of his successive operations, and must be regarded as a document of great local interest. The mode of preparing and removing large trees described by Sir Henry Steuart, was largely practised by Lord Caernarvon, sixty years ago. Many of the beech trees, now of large dimensions, in Sidon Vale, to the right and left of the old avenue, were so removed soon after 1770. In 1795 and 1796 many large beech trees were transplanted to the north of the house; again in 1798 and 1799, others were transplanted; again in 1800; and to various spots and at various intervals, between these periods and since. These attempts were almost invariably successful. To show how thoroughly Lord Caernarvon had appreciated the principles of this practice, we copy an extract from his memorandum book, written at least forty years ago:

"'The best way of planting large beech trees of any size is to cut in the lateral branches not close to the body in the beginning of February; and in the autumn following (or even in the same spring) to cut round the roots and fill the earth in; letting it stand till the succeeding autumn, or longer, by which time the tree will have made young branches and young roots, and be in vigor and fit upon removal to push immediate roots. It should be taken up without cutting the roots much more, and put into a hole with the earth in mud, filled in and well staked. The young roots will immediately strike and the young branches shoot. Planting in earth made thick mud, is an excellent way. The tree should be planted level with the ground; it suffers if sunk below the level of the ground. The top or leading branch of a beech, indeed of any tree, should not be cut off.'

"On riding round the grounds at Highclere, the fine taste which dictated the position of the masses of trees, and of single trees, is obvious: how much attention was bestowed upon this point by the above named nobleman, another extract from his memorandum book will show; and it will, at the same time, afford a useful lesson to all planters and place improvers.

"'In planting single trees about the house, great care should be taken not to hide the house from essential parts of the park; for, though they might be of advantage, when seen from the house, yet, viewed from Smart's Hill, Ten Hill, Hopgood Hill, also from Guine's Coppice the head of a single tree may hide the house

though you may see under it from the house. Great care has been taken in placing the present trees; which might have been placed better, choosing their position from the house only, but I think could not have been placed any where else, taking into consideration the necessity of keeping the view of the house clear for the beauty of the above-named spots, giving at the same time sufficient grove near the house. The best way to ascertain the position of a tree is to fix a white pole with a white rag hung to it, and then ride round the park to the heights from whence the house is seen. Till I adopted this plan, I was obliged to take away trees inadvertently planted, which is extremely mortifying.'

"The fine cedars which adorn the immediate environs of the house were (with the exception of two, raised from a cone brought immediately from Lebanon, by the celebrated Oriental traveller, Dr. Pococke,) all raised from seeds by the first Earl of Caernarvon; and the largest of them was planted out between the years 1773 and 1778. These fine trees may serve to dissipate a commonly prevalent error, which attributes to the cedar of Lebanon the character of slowness of growth; and to show planters that this most stately of evergreen trees actually makes a progress superior to most trees in our climate. A fine specimen, upon the lawn opposite to the north-western angle of Highclere House, was planted there in the spring of 1778, being then 4 ft. high, and having been raised from a cone gathered at Wilton in 1772. Being measured on the 5th July, 1832, its circumference at three feet from the ground was 10 ft. 2½ in.; another immediately to the south of it, being examined at the same time, measured 10 ft. 3 in.; a third, in the park to the north of the house and close to the back entrance, measured 10 ft. 6 in.; but it is useless to multiply instances. Beeches planted about the same time are not nearly so large. The first Lord Caernarvon, who not only thus improved his grounds, but also added largely to his mansion, and gave it a third front, died in 1812. His plans were actively pursued by the late earl; who, bringing to the task taste of the highest order, added most materially to the magnificence of his demesne. A large extension of Milford Water, not yet completed according to his views; the creation of the exotic plantations surrounding it; a new line of approach to the house, the alteration and improvement of which occupied much of his attention during the latter years of his life, and were left incomplete; and the creation of the curious collection of American plants scattered through the shrubberies in the pleasure-grounds, are among the operations of the late Lord Caernarvon. We have spoken of the magnificent cedars which adorn the lawn at Highclere. The heath-mould plants usually denominated American are not less striking. Unfavorable circumstances of local climate, which hardly allow an arbutus to protract a wretched existence, induced His Lordship to rely principally upon rhododendrons and azaleas for the decoration of his shrubberies. To extend the garden varieties, and protract the flowering season of the family, became an object which, most actively pursued, has been attended with uncommon success. By means of hybrid intermixture, the season for these beautiful flowers, beginning about the end of April, lasts till the middle of July, almost three months. The very splendid rhododendrons, brilliant to the highest degree with their crimson corollas, of the variety obtained between the Rhododendron arboreum of Nepal and R. catawbiense, and named by Dr. Lindley after the Doomsday name of Highclere, (Alta-Clera,) Rhododendron alta-clerense [see Bot. Reg., vol. iv. t. 1414, and vii. 472,*] come into flower about the third week in April, and are succeeded by a multitude of splendid varieties both of Rhododendron and Azalea, ending with the crosses obtained between Rhododendron maximum and Azalea autumnalis rubra. The number is continually increasing; and however perplexing to the botanist who will have the disagreeable task of distinguishing between indigenous species and these endless horticultural varieties, yet it must be owned that to this art of hybridising the flower-garden is, and will be, indebted for a great accession of beauty and enjoyment. Of the many achievements of this nature at Highclere, the most striking is to be found in the crosses effected between Rhod. arboreum and the hardy species. These hybrids, which as far surpass the common rhododendrons as the new double Scotch roses do the old wild ones, are perfectly hardy, exceedingly floriferous, and cannot be surpassed in splendor. Of the azaleas, the most splendid are bred between the fine garden varieties of Azalea calendulacea and Azalea nudiflora var. rubescens; and it may be predicated of all these hybrids, that they possess a much greater tendency to profuse flowering than the unadulterated species. The history of the hybrid R. alta-clerense is curious in the way of floricultural anecdote. To obtain it had been a great desideratum; but the specimens of R. arboreum at Highclere had shown no disposition to flower. The only places in England where it then (1826) flowered were Hylands (Mr. Labouchere's) and at the Grange. From the latter place an umbel was obtained and conveyed to Highclere in a tin case. By means of its pollen the flowers of R. ponticum and R. maximum were fecundated, and about 1800 seedlings were raised, many of which, after supplying his private friends, Lord Caernarvon desired might be distributed among the nurserymen. This was done in the spring of 1831. Those which were retained at Highclere have now attained a flowering age, and form extensive shrubberies round the house."

The pleasure-grounds are about 100 acres in extent, and contain many fine specimens of exotic trees and shrubs, among which were tulip trees, black walnut, deciduous cypress, Virigha lutea and Magnolia acuminata and tripetala. The climate is so severe, that M. obovata and the stuartias can hardly exist. Among the shrubs, a large leafed variety of Cotoneaster microphylla insulated on the lawn, its branches covering a space of thirteen yards in circumference, is a very conspicuous object. The formation of these shrubberies, we were told, was an arduous operation: the ground has been made to the depth of between three and four feet, and the mould was carted from the park woods in the vicinity of the lakes, a distance of nearly two miles.

"The climate of Highclere, as might be expected from its situation, immediately under the northern termination of an extensive range of bleak woodless downs, is very unfavorable to horticulture. The profusion of lichens and green moss upon the trees attests its humidity. Many shrubs which endure the open air well at Newbury, only five miles off, live with difficulty here; and the only counterbalancing advantage is a comparative exemption from autumnal frosts. The site of the house is about 600 feet above the level of the sea."

To encourage Permanent and Substantial Improvements.—The wealth and agricultural prosperity of a country materially depend on such great and substantial improvements being promoted, as, 1, Roads and bridges; 2, Canals; 3, Railways; 4, Harbors; and, 5, Embankments; and, where the aid of government cannot be given to such undertakings, the establishment of corporations under the sanction of public authority might be found an advantageous mode of carrying such improvements into effect.

1. *Roads and Bridges.*—As the first means of introducing improvements into a country, roads and bridges are essential; and where the population is thin, and the country is poor, there is no possibility of having such communications made, without public assistance. Two plans for that purpose have been adopted in making roads. By the one the military have been employed in such public works; by the other, under the authority of Commissioners appointed for that special purpose, the public has agreed, in the more remote parts of the country, to advance one-half of the expense of making roads and bridges, where the proprietors come forward with the other. The communications which have been opened, in consequence of this encouragement, are numerous, and the public will soon be amply indemnified, for any sum it has thus expended, by the increased revenue it will derive from districts which have hitherto been unproductive.

In time of peace also, the military cannot be better employed, than in carrying on public works of so useful a description as roads, canals, &c. Unless when engaged in war, soldiers are the better for being thus actively employed; it strengthens their bodies, and occupies their minds. The remains of those roads, which were constructed by the Roman armies, fully prove what that intelligent nation considered to be the best means of preparing soldiers, in time of peace, for the hardships and achievements of war.

2. *Canals.*—The advantages of canals to agriculture need not be dwelt upon. They facilitate the means of conveying the bulky productions of the soil to market, and also of bringing at a moderate expense, not only coal, but lime, and other manures, to the farmer. Under a proper system, also, the surplus water might be usefully employed, for the purposes of irrigation. On all these accounts, canals ought to be encouraged by the government of the country. It is not desirable, except in very particular cases, that they should be executed at the public expense; but it would greatly promote such useful undertakings, if government were to lend a certain sum to the proprietors of such canals, at a moderate interest, to enable them to complete any undertaking of that sort. This was done for the Forth and Clyde navigation; and the company has since repaid the loan. The same plan might be successfully adopted in other instances; and the principle is at last sanctioned by parliament, in a recent act, the effects of which, under judicious management, can hardly fail to prove highly beneficial.

3. *Railways.*—This new mode of conveyance is capable of being rendered as extensively useful as canals, and is well entitled to the encouragement of government, by loans of money, at a moderate interest, to carry them on. The government of this country can always borrow money at a cheaper rate than private individuals, from *the speculation* that attends public loans; and the easiness with which the monied interest can re-invest their savings in the funds, in preference to any other security. Railways would be particularly convenient where canals are impracticable, and where either may be undertaken, the former, being less expensive, will often be preferred. They ought to be promoted, because the more that communications can be opened between one part of the kingdom and another, the more does a country prosper, and the more are the people in it combined into one great community.

4. *Harbors.*—Though harbors are more essential in a commercial than in an agricultural point of view, yet they are still of material consequence to the husbandry of a country, by facilitating the exportation of bulky articles of produce, and the importation of coal and lime, those essential articles to the farmer. The same plan of public assistance, either in whole, or in part, will be found as useful in regard to harbors, as to railways or canals, and has answered in practice. Certain sums of money, (arising from the forfeited estates in Scotland,) which were at the disposal of parliament, were granted for im-

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* In this page, Mr. Gowen, the originator of all these hybrids, is spoken of as the gardener at Highclere. This is erroneous; Mr. Gowen should have been designated an amateur of gardening; Mr. Carton was the gardener at the time the first hybrid rhododendrons were raised, and one variety (see Hort. Brit. 29193) is named after him.

proving harbors on the north-eastern coast of Scotland. The sums given were trifling; in general, from two to four thousand pounds each; and excepting in one instance, where the sum was granted to encourage a fishing establishment, erected by a public spirited company, (the Society for improving the Seacoasts of the Kingdom), the inhabitants of the towns or neighborhood, where that assistance was bestowed, were bound to furnish one half of the total sum to be expended. The effect of this system has been most beneficial. It is not so much indeed the sum actually given, *as the spirit which it excites*, that is of service; and when once such a spirit is roused, it is not confined to one object, but extends itself to others. Little causes thus produce great effects; and a moderate public expenditure of a few thousand pounds may lay the foundation of an extensive fishery, or a great emporium of commerce, and promote, at the same time, the agricultural prosperity of an extensive district.

5. *Embankments.*—When the difficulty and hazard of embanking a considerable tract of country, either against the overflowings of a lake or river, or the inroads of the sea, are considered, there is no undertaking that seems better entitled to the encouragement of a wise government. Extensive tracts of fertile territory may thus be acquired, greatly to the public advantage. The soil thus obtained is generally of a nature peculiarly productive, and well adapted for agricultural purposes. To carry on such undertakings, however, at the public expense, might be hazardous; but when their utility, and ultimate profit, are sufficiently proved, by the evidence of intelligent engineers, to the conviction of parliament, it may be advisable for the legislature, in time of peace, to authorize the advancing one third, or any other proportion of the estimated expense, at a moderate interest.

Where extensive drainages are necessary, the same encouragement ought to be given.

6. *To establish Corporations for carrying on Beneficial Improvements.*—Many of these improvements might be successfully promoted, *by the establishment of corporations*, for carrying on particular objects, which cannot be effected by individual wealth. This is frequently done in the case of canals, and ought to be extended to other means of improvement. The formation of such associations is at present the more expedient, that there is likely to be a large capital, requiring profitable employment, much of which will be sent abroad, unless it can be laid out at home with advantage. Much good therefore might be effected by erecting public companies, for specific objects of improvement. Each company should be permitted to raise a capital adequate to the object in view. It should execute no work itself, (planting perhaps excepted,) but should merely be permitted to lend money, at any rate of interest, not exceeding five or six *per cent.* to all such landed proprietors as had any great improvement to execute; the sum advanced never to be demandable, but the stock of the company to be transferable, like other public securities, which would answer equally well the purpose of those stockholders who might wish to receive again the sums they had subscribed. Estates under the fetters of strict entail might thus be improved, which otherwise would be neglected. The surplus capital of the country would thus be employed at home, *and embodied*, it may be said, with our own territory; and the whole country would be improved in a manner, and to an extent, that cannot otherwise be attainable.

It was by promoting such measures as these that the most celebrated statesman of modern times, justly called Frederick the Great, (more from his attention to internal improvement, than to foreign conquests,) raised his dominions, notwithstanding the disadvantages of situation, soil, and climate, to that height of prosperity and power to which they attained during his reign. His practice was to lay out about 300,000*l.* sterling *per annum*, in the encouragement of agricultural improvements, which he considered "as manure spread upon the ground," to secure an abundant harvest; and in fact, instead of being impoverished by such liberal grants, he thereby increased his revenues so much, that he was enabled to leave a treasure behind him amounting to above 12,000,000*l.* sterling. On the other hand, this country, owing partly to unfavorable seasons, partly to its increased population, but principally to its agricultural interest not being sufficiently encouraged, has been under the fatal necessity of transmitting to other nations above 57 millions sterling, in the space of twenty years, and no less a sum than 12 millions *in one year*, to procure food for its inhabitants!—[Sinclair.]

BENE PLANT.—I feel confident the *Bene* plant would flourish and thrive wherever the okra and tomato are now raised,—with this difference, that the *Bennet* thrives and grows best on a poor sandy soil, not quite strong enough for the okra. From the *Bene* seed the purest oil in the world is expressed. It is acknowledged by all foreign and domestic epicures, to whom opportunities have been afforded to try it, that it is superior to the finest olive oil, for *all* the purposes to which that foreign oil is applied; and superior in another important particular, it never becomes rancid—like Madeira, the older it is the better. Mr. Milledge, a former Governor of Georgia, sent a bottle of the *Bene* oil to Mr. Jefferson, or some other high functionary of Government, who unhesitatingly pronounced it superior, in *all* its qualities, to the olive. We only want a proper machine in Georgia to express oil from the diminutive *Bene* seed, to supersede, in the course of a few years, the use of every other oil for domestic purposes. A visit from, with the 'cute' observation of, a citizen "away down East," would soon "find out the way," not only to enrich himself with a patent, but to receive the thanks and plaudits of the whole south.—[Farmer and Gardener.]

MELONS.—A French periodical gives the following method of hastening the ripening of melons. Spread on the melon and round it a thick couch of from one to two inches of pounded charcoal. Lampadius tried this plan at Friebuler in 1813, and succeeded in making melons ripen in a box of earth in the open air, during the summer of that year, in the mining district of Saxony. The surface of the earth thus covered with charcoal had at noonday a temperature of 37.50 to 47.50 of Reaumur, while at the same time the thermometer in the shade was only at from 15 to 20, and in the sun at 25 to 37.50.

CLIMATE OF ENGLAND.—The following, from an intelligent American correspondent of the New-York Observer, strikes us as being from an unbiassed mind.

RYDE, Isle of Wight, Aug. 9, 1834.

Like many others, who find London a narrow and uncomfortable place in the heat of summer, I yesterday obeyed an impulse I have a long time felt, and took a Portsmouth coach with a friend, for this beautiful and enchanting retreat. Although I had been in England two summers, and a third winter, I had never experienced either severe cold or extreme heat. Indeed I have felt nothing like winter weather since I crossed the Atlantic. Last winter there was scarcely a frost during the whole season, in London—not enough to make ice on a bucket standing exposed; and as for the first two summers which I spent here, I had concluded that there is never any weather in England which we call hot in America; and also, that there is no thunder and lightning here. I have often remarked, that England is one of the finest climates in the world; and I still believe it is. Its insular condition and the qualifying influence of the surrounding seas seem to bar both extremes of heat and cold, and so to purify the superincumbent atmospheric regions as to prevent a *malaria* in any part of the British Isles. My philosophy may be defective, or imaginary, but the fact is nevertheless notable, that excepting cases of consumption, there is no country, with which I am acquainted, or of which I have heard, so healthy as Great Britain. There is no country, I imagine, where the countenance of the people indicates so generally a good and vigorous state of health. The most healthy parts of the United States are comparatively defective under the application of this particular test.

I must confess, however, that there have been this summer both warm weather and thunder and lightning. But still the heat has not been so very oppressive, nor the thunder at all so startling, as we in America are used to. "*There!*" said an American, who was rather overpowered by the claims of an Englishman to the superiorities of his own country, while travelling together in one of the States, and being suddenly surprised by one of those vivid flashes of lightning and tremendous peals of thunder which are so common in America—"*there!*" said the American, "have you any *thunder* in England equal to that?" The pale and affrighted countenance of the Englishman was a sufficient answer. Although there has been not a little of thunder and lightning in England this summer, it is seldom that it comes with very great earnestness. Even the heat of London this warm season has been tolerable, compared with what is every summer experienced at New-York and Philadelphia, especially in the latter city.

SCENE IN COVENT GARDEN MARKET—FRUIT IN ENGLAND.—A correspondent of the New-York Observer, under date of June 9, 1834, draws the following picture of wretchedness.

Covent, or Convent Garden, was once the garden of St. Peter's Convent, is situated in what is called the West end of London, a little more than a quarter of a mile from Temple Bar, and forms a square of three acres, in the midst of the most populous part of the metropolis. Near to it are Covent Garden and Drury Lane Theatres. Exeter Hall is also in the neighborhood. It is a little north of the Thames, and of the great thoroughfare called the Strand. It is a market for fruit, flowers, and vegetables—than which, there is probably not a better one in the world. The square is nearly covered by three ranges of market shops, running from east to west, open, and well suited to the purpose, though not remarkably imposing.

As I strolled through this market the other day, I was tempted to purchase a basket, or, as they call it here, *pottle* of strawberries, and chose to stop in the market to eat them, as such delicious fruit is easily disposed of; though I must confess it is better with cream and sugar after dinner. I had scarcely began my sweet repast, before a ragged and offensive looking girl, about 10 or 12 years old, presented herself, looking with wishful eyes, as if she were willing to be a participant. I thought it remarkable that she did not beg audibly, as that tribe in London are not very bashful. She picked up the stems, as I threw them down, and sucked them. Is it possible, thought I, that this creature is so hungry? I turned a little to get rid of the offensive object, but the girl followed; she came close on my heels, picking up the stems, as I dropped them. I wound around among the fruit baskets and fruiterers of the garden, eating my strawberries, hoping to elude and escape my pursuer. But instead of one, there were two, and soon three, at my heels. Before I had half emptied my basket (pottle,) there were at least a half dozen in the shoal, from whom, by no ingenious device, could I escape. They flocked around me like a swarm of mosquetoes about the head of a horse, in a hot summer

day, as his rider urges him through the forest road, hoping for relief, alike for himself and his brute. But, alas! the murderous blood-suckers are still in his company! So I tried in vain to go beyond this *shoal* of ragged, filthy, and unpleasant attendants—I might call them *attachments*. They still increased, till they amounted to nearly twenty. I imagined myself and my group the objects of universal attention. At one time I gravely thought of throwing to them both strawberries and basket, to see if that might satisfy them, and then to take to my legs, with the best of my abilities, if, peradventure, I might escape. However, I thought better, and concluded to retain my rights; and the ragged, greedy urchins concluded to hold on to theirs. Still they said not a word—they did not beg, except by their attendance. This silence seemed strange. As I came towards the bottom of the basket, they were all about me like a swarm of bees. Indeed, they were very annoying. The less there was of the fruit, the more earnest they seemed to be, as if dissappointed hopes made them mad. They held up their hands; they scrambled; they seemed as if they would tear me in pieces. I was fairly mobbed; excepting only they laid no hands upon my person. To me it was a novel scene, and inexplicable. What could they want? They said nothing; not a tongue of them cried—"Give me one;" and yet they were evidently after something.

Observe: a strawberry pottle, like all measures in London not regulated by law, is a cheat. It is a small conical basket, made of frail splits, the bottom of which is just large enough to make the bed of one single strawberry. It is about 8 inches long, opening gradually, till the top measures perhaps 3 inches in diameter, with the capacity of a pint measure. When strawberries get to be abundant, the price of one of these baskets is *sixpence*, nearly one *eighth* of a dollar. At present, they are from one shilling to two, according to the degree of their freshness, &c. When they first make their appearance in the confectioners' windows, they are weighed out in the nicest balances, and sold for sixpence and one shilling apiece.

As I came towards the bottom of the basket, I was literally mobbed by the fury of these assailants, when all at once the secret of their strife came out: It was the *basket* they were after, which they knew I would throw down, when I had finished the strawberries! It would bring them one *farthing!* (half a cent.)

Strawberries in England are very large. The best of them are, on an average, as big as crab apples. They are not so delicious, however, as the same fruit grown in a warmer climate. The same remark applies to fruit generally in these islands, especially to apples and peaches. I have never ate a good apple, or a delicious peach, grown in England. Melons also are equally imperfect, and are positively insipid. Indeed, this is not the land for good fruit. After one has been accustomed to eat the grapes of France, he may be tempted by the *sight* of grapes in England; but the *taste* will disappoint him sadly. And the expense, too, is enormous. On the continent, the poor might live on grapes; in England, they are only for the tables of the rich. All fruit is dear here. Indeed, it may be said, there never was a land of greater plenty, or greater scarcity, or more wealth or more poverty, than England. Those who have money can riot in every luxury: but the poor must starve.

The Moral.—The streets of London are full of poor, and ragged, and untaught children, whose parents, themselves poor, and ragged, and as undisposed as they are unable to provide for their children, send them out to pilfer, and to gather what they can from the wretched gleanings of the streets of a city. You see them every where. Like certain classes of birds that follow the plough for the worms that are turned up in the new-made furrow, or that wander over the fields in pursuit of insects, so these creatures live on the crumbs of the street. They are ignorant, they are depraved, they are thievish; there is nothing too filthy or too wicked for them. They abound more especially in certain districts of the metropolis, where the poor are congregated. They are a class of human beings as low and as bad as can be, and for which, as yet, there is no redemption. Their misery, in the great mass, is unapproached and untouched by the schemes of benevolence. Nothing can exceed their degradation. There may be other conditions of heathenism, in pagan lands, as low, because like exposures bring human nature to the same place; but nothing can be lower. The poor and the depraved of a great city are the basest of human kind. A view of them, as they are, would doubtless be as frightful as it would be disgusting. To think that our property, our comforts, and our lives, are placed in the midst of such a mass of wickedness, which nothing can restrain but physical force, or the fear of it, might well disturb our tranquillity for a moment, and induce us to ask—Is there no help, no remedy for such a state of things? Is not the community responsible?

Grub or Cut Worm destroyed by Salt.—*Mr. Fleet:* These are very troublesome on Long Island, and destroy annually much of the corn planted on the Island, and also on old lands. I believe common salt is an antidote; and, if properly applied, will destroy them effectually. Some years ago, I visited a friend at Naples, Ontario county; he mentioned that the cut worm or brown grub abounded in his garden, insomuch that he could raise no peas, cabbages, &c. In the evening I went with him to a row of peas, 14 feet long, and gathered a half pint cup heaping full of grubs; six or eight of these were laid on a sheet of white paper, and a particle of moist Onondaga salt applied to each. The worms curled, burst, and died in two minutes. It was agreed that he should dig his garden in the fall, and sow on it at the rate of 4 bushels of Onondaga salt to the acre; dig it again in the spring, and sow 2 bushels per acre of salt. He did so, and I heard no more complaint of the grub or cut worm. I am persuaded that if lands infested with them be ploughed in the fall, and fine salt sown, 4 bushels to the acre, and repeated 2 bushels in the spring, it will effectually eradicate them. It is worth a trial, at least. R. M. W.

October 25th, 1834.

Colic in Horses.—It is a source of consolation to sensitive minds to reflect that the diseases of the brute creation are few and simple in their nature: but, at the same time, it is mortifying to know they are not considered sufficiently important to require the attention of men of science and ability. Too little attention is generally devoted to a proper acquaintance with these diseases, when their treatment properly belongs to every husbandman. If each farmer having a knowledge of an approved remedy for any disease were to communicate it, the information would become as extensive as the Register is circulated—nor would I consider it too heavy a tax upon its columns. These truths being impressed upon my mind, I am disposed to follow the humble manner of some of your correspondents, and give a recipe I have always found singularly efficacious for colic in horses.

The causes of this disease are numerous—bad food, hard rides, constipated bowels, sudden transitions from heat to cold and the reverse, bots, and even customary food, when the system is previously weakened by fatigue and overaction. To cure the disease produced from any of the foregoing causes, I generally administer an ounce of laudanum in a little water, which has invariably succeeded with me—but candor compels me to acknowledge my veterinary practice is not extensive: but I have used the above recipe successfully after the ineffectual administration of a variety of other remedies, which entitles it to farther trial.

Its mode of operation may be explained upon philosophical principles. The various causes of the disease generally destroy the equilibrium of circulation and excitability. The blood flows from the surface of the body towards the point of diseased or weakened action, and congestion ensues in some part of the alimentary canal. So long as this congestion exists, so long must nervous irritation and spasmodic action, and consequently the suffering of the animal, continue. But restore this altered circulation and derangement, and ease follows; a healthy and natural condition of the system immediately supervenes. Now no remedy promises so far to fulfil these healthy indications as laudanum. It is a powerful anti-irritant and diffusible stimulant, as well as anti-spasmodic. The irritation being relieved by any remedy, the spasm relaxed, and a cure follows as surely as light drives away darkness. No danger need be apprehended from its early administration, but if fever and inflammation were to exist, it would be certainly forbidden. This condition of the system requires bleeding, purging, and clystering—and frequently a use of cold water on the surface. R. H.—[Farmers' Register.]

Cichorium Intybus, Wild Succory or Endive.—The importance of this plant will be seen by the following extracts. It is spoken of in England as an early food; with us it would probably do well through the winter, as other kinds of endive flourish best in that season.

From Young's Tour in France, Pinkerton's edition, p. 283. "I have the satisfaction to find that M. de Pahciel has as great an opinion of Chicory as ever. That his brother had adopted it—that it was very flourishing on both their farms, and on those of their neighbors also. I never see this plant but I congratulate myself on having travelled for something more than to write in my closet, and that the introduction of it into England would alone, if no other result had flowed from one man's existence, have been enough to show that he did not live in vain."

See, also, Domestic Encyclopædia — Art. Chicory—where it is stated that it has yielded from twenty to forty tons of green fodder per acre. It has been sowed broadcast, but answers better in drills. It defies drought, being of early growth. The root is perennial. It makes nourishing hay. Its produce is said to be superior, upon the whole, to Lucerne, in the proportion of three to one. A piece of ground was found to yield by the acre, the year of sowing, at two cuttings, July and October, 19 tons 4 cwt. Second year, three cuttings, May, July, and December, 38 tons 9 cwt.; and the average produce of four years was nearly 30 tons. The acre yields from 150 to 350 lbs. seed.

See, also, Gleanings of Husbandry.—It will thrive on most soils. Is sowed 10 lbs. seed to the acre. In England, either with or without clover and other grasses. Has been cut three times in a season, first the 20th of May. Given as soil to horses, when hard worked, without either hay or corn. With sheep and pigs it is supposed to succeed even better than with large cattle. The Swedes, in times of scarcity, make a bread from the roots.

This plant would most probably prove a great addition to the resources of the farmer in this country, especially during the winter and early in the spring. If it has not been noticed before in your periodical, it would be well to introduce it to the notice of our agriculturists; and the public would be indebted to any one who would try it, and publish the result. Columella. — [Southern Agriculturist.]

DECOMPOSED SALT AS MANURE.—A short time ago we published, under the agricultural head, an extract from an English paper, relative to a new manure discovered by a Mr. Henry Kempt, of Dorsetshire. The manure was decomposed salt; and it was affirmed that an acre of land might be prepared with it for the reception of any crop, at a cost of ten shillings only; and further, so great was the fructifying qualities of the new discovery, that ground which formerly, under a good ordinary manuring with yard dung, produced twenty bushels of wheat, would with the decomposed salt yield a return of from thirty-five to forty bushels. In this day's number we give the process by which the salt is decomposed, which we consider of the utmost importance to our farmers generally, and another attestation of its virtues. It has long been a serious complaint, the difficulty of providing manure in quantity sufficient to insure a more extensive cultivation. Land cannot be brought under the plough, and the agriculturist is also prevented from clearing his acres of woodland, from the impossibility of keeping it thereafter under crop, solely from the want of this necessary. Any discovery which will therefore supply such a desideratum in farming processes is worthy of attention; and we hope some of our country friends will give the decomposed salt manure a fair trial, and for the information of the public communicate to us the result of the experiment.—[Halifax Times.]

To the Editor of Bell's Weekly Messenger.

Sir,—Having read in a Farmer's Journal in April, 1832, a letter from Mr. H. Kempt, on the value of decomposed salt as a manure, I was one of those mentioned in the pamphlet, since published, who applied to him for information on the subject. The object of my letter to Mr. Kempt was not to find out the way to decompose salt, being at that time and constantly since in the habit of using salt decomposed; but I considered, from the time and talent Mr. Kempt had devoted to the subject, that he had some superior or cheaper way of effecting its decomposition. I have since purchased Mr. Kempt's pamphlet, and as he justly observes, in page 68, I did conclude that every succeeding page would have afforded me the desired information. I can but regret that Mr. Kempt should still think proper to withhold from the public such a valuable discovery. Subsequent to the publication of Mr. Kempt's pamphlet, I have been daily expecting to hear that he had received the quid pro quo, so much desired, or that he would have publicly stated the remuneration he required, neither of which having taken place as I know of, I feel it a duty to my brother farmers at once to state the various ways that I have employed for the decomposition of salt, each I think effectually accomplishing that object, and must leave them to choose which may suit them best, only observing that each way produces the effect described by Mr. Kempt. I am indebted in the first instance to a chemist for the information, having but little time for experiments. I have been in the habit of preparing salt three ways. My first method is to add 40 lbs. of common potash to 60 lbs. of common salt; my second method, and which I have most generally used, is to 60 lbs. of common salt, add 20 lbs. of dry wood ashes; my third plan, with which I am not quite so well acquainted, but which I considered the most decided in its effect, is to burn the salt in a kiln till it is decomposed, which it will be if properly heated. I have not time at present, nor can I further trespass on your columns, to state the method of mixing, using, &c., or which is the cheapest mode. But I call on your correspondent, the Agricultural Chemist, to state if there is any readier or cheaper way by which the decomposition of salt may be effected. I have no doubt he will at once step forward to assist us and unfold whatever remaining mystery there is attached to the discovery. If you consider this communication worth your notice, I shall feel pleasure in further stating all the knowledge I possess of this most valuable manure.

I remain, sir, your obedient servant.

ROTATION OF CROPS.—The British Farmer's Magazine, just published, contains some very useful articles,—among them we have to notice some excellent observations on the Tulian System of Husbandry, and an article on the "Rotation of Crops," written by Mr. Towers: from the latter of which we give an extract.

"It is a fact, established beyond the reach of doubt, that a rotation of crops is to a certain extent necessary. Without the practice of alternating husbandry, ground becomes incapable of supporting several of the principal supply crops of the farm. Wheat, barley, oats, and peas—probably every one of the important leguminous species—deteriorate, if they be planted in unalterating succession. In order to account for this noted fact, and, perhaps, to avoid the labor of thought and investigation, common observers have not hesitated to ascribe it to the exhaustion of the soil; they have said—'the land has become tired of the crop; it has been deprived of certain specific qualities which nourish certain individual plants;' hence, recourse has been had to fallowing, manuring, and rotation of crops. Every growing herb, to say nothing of the descending specific fluids, gases, &c., which are prepared in its cellular vessels, produces multitudes of roots and rootlets: these are immediate organs of supply to the plant: the former are readily visible to the eye—but the latter are minute and numerous, and ramify to an amazing distance. Whoever has carefully examined the soil under turf—or that of a cabbage-bed, when digged for re-cropping—must be satisfied that myriads of fibres pervade its whole mass. These rootlets can never be removed; they remain, and decay, and in their decomposition afford manure to the soil. But, for a time, this manure possesses specific qualities, and gives out a manifest odor quite distinct from that of the soil, either when enriched by composts, or in its natural state. The rank odor of cabbage root, kidney-bean, of pea, is plainly perceivable; that peculiar to other crops is also present, and may be detected, but it is not, perhaps, so unequivocally evident. The color, also, of ground, under crop, becomes tinted; the yellow fades into a shade of brown; the red, or hazel color, gradually acquires a dark hue, and, finally, becomes nearly black. Soil, under crop, therefore, is enriched, but, in many instances, it is not improved for a crop of one individual kind.

"On these considerations, and others to be shortly mentioned, I maintained, five years ago, that plants gave to the soil specific matters, which rendered it wholly unfit to support the same species in uninterrupted succession; in a word, I advocated the theory, (which is ascribed—and justly—to Professor De Candolle, of Geneva,) of the rotation of crops, in connection with, and resulting from, "the excretory power of plants." Mr. Maine, of Chelsea, has in the most handsome manner mentioned the views entertained by the author of the 'Domestic Gardener's Manual:' and I owe it to that gentleman to return him my cordial thanks for this additional proof of the kind feeling and true politeness that he has ever evinced towards me. I do not, however, any longer take the credit to myself of having been the first who made the discovery. I believed for several years that no one but myself had advocated the theory so long back as 1829, nor had I the least suspicion that it had been promulgated by any one till I received a letter from Mr. Knight last year, stating that some foreign physiologists had recently conjectured that plants emitted poisonous matters into the soil. I have lately, however, seen a paper in the Quarterly Journal of Agriculture, wherein it appears that M. De Candolle had advanced his theory two or three years before I wrote the passage in my book, which I shall quote, in order to prove the grounds I took at that period, (1829,) and to elicit further observation on the part of the scientific reader.

"To the philosopher of Geneva, then, I cheerfully yield the palm of priority; reserving to myself, however, the credit of having stated my opinions without either inter-communication with any one, or knowledge that any human being entertained similar opinions with those which I promulgated. In England, perhaps, there exists no one who will advance a claim to priority; I know of none, never received a hint from any one, and was guided by my own observation of facts to the conclusions which I shall cursorily refer to. It is well known that a plantation of raspberry bushes requires frequent renewal. In considering the cause of the deterioriation of this shrub, I was led to connect it with that of grain, and of some garden crops, and while writing upon the raspberry, I threw together a few hints, the substance of which I now give.

"Whenever raspberry plants are removed to another situation—for experience proves, that to have a constant supply of fine fruit year after year, the mould must be changed—the spot from whence the plants are taken should be deeply digged, well manured, and its surface turned, by bringing up some of the subsoil; and then it should be placed under some vegetable crop. By this mode of treatment it will be brought into a condition to support raspberries again, in two or three years. This curious and most interesting fact proves that it is not by exhausting the soil that plants become worse, if they be placed on the same ground year after year; for were that the case, manuring would prove an effectual remedy, whereas it fails to do so. Thus, if peas or wheat be grown repeatedly on a piece of land, the farmer may manure to any extent, but still his crop will dwindle. In the chalky district of the Isle of Thanet, if the land be "overpaid"—to use a local term,—it becomes as it were poisoned: and if peas be again planted, though they rise from the soil, they soon turn yellow, are 'foxed,' and produce no crop. This fact I witnessed, and was then

assured that it was thoroughly established by constant experience.

"To account for the specific poisoning of the soil, we must suppose that particular plants convey into the soil, through the channels of their returning vessels, certain specific fluids, which, in process of time, saturate it, and thus render it incapable of furnishing those plants with wholesome aliment; in fact, the soil becomes replete with fecal, or excrementitious matters, and on such the individual plant which has yielded it cannot feed. But it is not exhausted; so far from that, it is, to all intents and purposes, manured for a crop of a different nature.

"I have seen no reason to suspect the truth of what I then asserted, and I cannot speak in more definite terms than those which I have quoted, to prove that the ground receives from plants, while living and growing, certain exuded matters, which are resolvable into nutrition by the organs of other plants. Independently of these exertions, which are processes of vegetable life, myriads of radical fibres are left in the soil, which extend, still further, to saturate it, to render it injurious to the individual, but to prepare and manure it for the reception and nutriment of plants of a different character. The theory has been scoffed at, and ridiculed by some nameless writer; but abuse is no argument. Let experiment determine its truth or fallacy; but, till it be overturned by irrefragable facts, we boldly advocate it, and fear not to assert that, by the theory of interchange between the fluids of the plant, and those of the soil, we are, (by no means,) enabled, philosophically, to account for the necessity of a rotation of crops."

Ice House.—A friend of the editor has requested such directions as we can furnish, relative to the construction of ice houses, and the preservation of ice for summer's use. In compliance with his wishes, we republish an article, (which first appeared in the N. E. Farmer, vol. x, p. 134,) written by Professor Cleaveland, of Brunswick, Me., than whom we know of no person more competent to give information on this or any other subject involving the philosophical principles of rural economy.

Mr. Fessenden,—In answer to your request for *practical* information on the subject of Ice Houses, I take the liberty of giving you a description of one which I constructed several years since, at a moderate expense, and in which I have been perfectly successful in preserving ice through *the summer and autumn*.

A pit, about 13 feet long and 9 feet wide, was dug in level ground to the depth of about 10 feet. The four walls, or sides of the ice house, consist entirely of *cedar*. Each wall is rendered double by nailing the boards to two opposite sides of joists 4 inches square, placed perpendicularly, at the distance of a few feet from each other. The interval between the boards is filled with tan, and a space of about 4 inches in width entirely around the building is also occupied by tan, so that the earth or soil no where touches the boards. Upon these walls, which are 11 feet in height, and of course project one foot above the surface of the ground, is placed a very sharp roof. This roof is also double, and the interval between the boards is filled with charcoal powder. It is painted white on the outside.

The aforementioned pit is divided by a double partition, filled with tan, into *two apartments*. In one of them, which is about 8 feet square, the ice is deposited. The other department is employed as an entry, at the bottom of which is a door, made double, as aforementioned, for the purpose of taking out the ice from day to day. This entry, whose temperature in the lower part is very uniformly that of cool weather in the autumn, is furnished with shelves for the reception of butter, meat, milk, &c. during the heat of summer, and is found to be extremely useful.

The ice is cut in blocks of regular form, and very closely packed, the interstices being filled with pulverized ice. All the space which remains above the ice is filled with dry straw. A few cedar slabs form the floor on which the ice rests. There are several reasons for preferring cedar to other kinds of wood; and I did not find its expense to exceed that of merchantable pine boards. It would be convenient to have the entry a little longer than the one just described.

Yours respectfully,

P. Cleaveland.

In a subsequent communication for the same paper, see vol. x, p. 139, Professor Cleaveland observes—"On reading the description of my ice house in your last number, it occurred to me that I might not have been sufficiently minute on one or two points. The roof is so sharp and high, that it affords a convenient passage into the entry, above ground, at the end of the building, by a triangular door, through which the ice is easily introduced at the top of the pit. This door is closed after the straw is deposited in the space above the ice. This one door *opening to the atmosphere* is sufficient for all purposes."

A writer for the New-England Farmer, (see vol. x, p. 139,) with the signature "*A Middlesex Farmer*," states as follows: "My ice house is a very simple and cheap affair. It is 12 feet every way, dug on a gravelly knoll. It has a stout cedar post, about 13 feet long, at each corner, and I believe four more posts between those, with a sill morticed on the top, all round, to keep them all in place. Outside of these posts it is planked with old cast-off bridge plank, which were originally 5 inches thick, and these are secured, not by nailing, but merely filling in behind with gravel. The roof is a common one, rather steep, sloping of course to the ground, and shingled in the ordinary way; the door is at the east end. There is no floor between the ice and the roof. The ice may be taken out at any hour, but it is generally done early in the morning. Before the ice is put in, some small spars, (round rails, if you please,) are placed on the bottom of the cellar, and brush put crosswise, so as to keep the ice from touching the ground. The ice is sawed in blocks of 2 or 3 feet long, and about 2 feet wide, and packed in the cellar, side by side. When filled to the top, some straw or shavings are laid over to a considerable thickness, *and that is all*. Some years, when the ice is thin, it is gone in September or October; but when it can be had solid, and of great thickness, after using it freely for all family purposes, and occasionally for neighbors, some of it remains at the end of the year. The posts should be about 13 feet, so as to enter the ground a little at bottom, and rise a little above the top, for the purpose of making a small bank outside for turning off the rain. The quantity put in is, I think, about 13 tons or loads."

It is remarked in the *Genesee Farmer*, that there is one important point in packing away ice which does not appear to be well understood. We mean the temperature of ice when it is put into the ice house. It is well known that, according to Fahrenheit's thermometer, 32 degrees is denominated the freezing point, or that degree at which the water congeals. If the temperature is raised but one degree above this the ice melts, but to whatever degree below the temperature is reduced, no change takes place. Now, it takes nearly the same quantity of heat to raise the temperature of a body one degree when it is below 32 degrees, that it does when it is above. From this position it is plain, that the colder the ice when packed in the ice house, the greater would be the quantity of heat required to thaw it, or the greater the length of time in the same temperature. Suppose one ice house was filled when the temperature of the ice and atmosphere was of 30 degrees, or two degrees below the freezing point, and another was filled when the temperature of the atmosphere and ice were at zero, then would it not require fifteen times the quantity of heat to melt the ice in the latter that it would in the former, and if the heat was communicated in the same manner, would it not require time in proportion? If so, then it is all-important, at whatever temperature the ice is collected, it should only be packed in houses when at the lowest temperature. Now, the contrary of this is often pursued. The gathering of ice is at best a cold business, and most people omit doing it until the last of winter, and then prefer those days which are most pleasant, and proceed to pack the ice in the house as it is gathered. There can be no objection to gathering or drawing the ice to an ice house in pleasant weather, but it should never be packed down but when the mercury indicates extreme cold, as in proportion to it will be the durability of the ice under the same exposure.—[New-England Farmer.]

German Geese.—Every farmer who has bred the native geese knows what pestilent animals they are. Almost as light as gulls, they are capable of soaring as high; so that fences and walls are mere matters of derision with them. Wandering into mischief is their delight through life, and when killed, fat indeed must be the bird which weighs seven pounds. All these untoward circumstances, necessarily connected with keeping the old breed of geese, have discouraged many farmers from having any thing to do with these animals; and no wonder, neither. But as every farmer does or should delight to see his yard stocked with as great a variety of fowls as possible, provided the trouble is not too much, we should take the liberty of recommending to notice Mr. George Sisson's excellent breed of German geese. This stock was imported by the late Judge Sisson, from Bremen, and has fully answered its very excellent character. The geese are of the purest white, beautiful as swans, weigh, when fat, from 18 to 22 pounds, flesh of an exquisite color and flavor, feathers abundant and of the first quality. Added to this, and by no means least, they are perfectly quiet in their dispositions. None of the squalling, creeping, and flying characteristics, so odious and common in the native breed, attach

to these beautiful birds. Mr. Sisson has a large flock at this time, and probably would dispose of stock to those who might wish to introduce this truly valuable and profitable race of fowls into their collection. So much superior are these geese to the ordinary breeds, that we wonder any person can be found willing to continue raising them when such a superior race may be so easily obtained.—[Warren paper, Rhode Island.]

"But when partly filled with garden mould, and carbonate of lime, 1½ inch thick over it, the plants put down their radicles strait through the lime, without *ramifying* or stretching sideways, till they arrive at the mould."—[Cultivator, 123.]

CARBONATE OF LIME.—*Mr. Fleet:* It is an old saying, that "actions speak louder than words." If we understand the language of the *radicles* above mentioned, it seems to me they would say, we find no food in the lime, therefore put out no spongeolets till we reach the mould. It is very certain that carbonate of lime (or chalk) contains much carbonic gas, but yields none to plants. It appears to me, that lime, before it is converted into carbonate, is rather calculated to absorb the food of plants than yield it to them. R. M. W.
Oct. 23d, 1834.

THE DROOPING ASH TREE seems capable, by the aid of art, of almost rivalling the famous Banyan tree of India, *Ficus indica*. In the garden in front of the Vernon Arms, in Pleasant Row, opposite York Place and Clarence Place, New Road, London, is a tree of the drooping ash, whose branches are trained on horizontal trellises, at the height of about 7 feet from the ground, over twenty-eight seats and fourteen tables, covering a space twelve yards long by seven yards wide; thus forming in itself alone, when in leaf, one large and umbrageous arbor. It is needless to add that this tree belongs to the inn. Of the seats and tables mentioned, fourteen seats and seven tables, each about two yards long, occupy one side of the arbor, and as many the other; and there is a walk up the middle for the convenience of access to the two sides. The stem of the tree is in the centre of the arbor, and carefully preserved from injury by a box-like frame, the boards of which are perforated towards the bottom to admit air. The extremities of the branches already extend beyond the roof of the arbor, and are trained to the side trellises. The tree is a beautiful specimen, in full health and vigor.

Has the remarkably large drooping ash which the Duke of Devonshire, a few years ago, transplanted from the nursery of Messrs. Wilson, near Derby, into the grounds at Chatsworth, thriven since the transplantation? The tree, according to the newspapers, was fifty years old when removed, and, with itself and the earth about its roots, weighed nearly eight tons. "Some of the roots extended 28 feet, and the branches measured 37 feet from the centre." Forty laborers and several horses were occupied in removing it from the ground, and loading it upon the machine used for transporting it. In p. 180, but particularly in p. 407, it appears that seeds of the drooping ash sown have not been known to produce plants with drooping branches, but always with erect ones. J. D. June, 1834.—[Loudon.]

ORCHARDS AROUND FARM HOUSES.—It is expedient that every farm should have some portion of orchard ground attached to it. The most convenient and guarded situation for it is immediately behind the house, so that the back kitchen door may open into it. It matters not whether it be on the north or any other side of the building. Many think that an orchard should be in a low sheltered spot, but this is a serious mistake. Fruit trees succeed best on a moderate high and open situation. Shelter from wind is certainly necessary, but this protection must be obtained otherwise than by planting in a dell. A deep mellow loam is most suitable for an orchard. It does not require to be richly manured, provided it is fresh, unexhausted, and sufficiently dry. Whether the subsoil be gravel or stone, provided such beds be not too near the surface, it will be no detriment to the trees; but if of a tenacious clay, which is retentive of moisture, then draining must be resorted to, in order to free the soil from a superfluous moisture. This must be done effectually, otherwise it will ever be a subject of regret to the planter. A sloping surface is better for all plants than a dead level, not because a heavy or long continued rain or melted snow runs off the sooner, but because that portion of it which sinks into the ground gradually passes downward in an under current, leaving no portion to stagnate in any one place, and to become prejudicial to the roots. The most profitable kind of orchard is that which contains all kinds of hardy fruit trees and bushes, and where the land is solely appropriated to that purpose. This kind resembles gardening more than farming, and is therefore unsuitable to large farms, but quite applicable to small ones, to which an acre of orchard, requiring no horse labor, would be of essential benefit. In such orchards, half standard apples are planted in rows eighteen feet from each other, the trees being twelve feet apart. In the same line with the apple trees are planted either gooseberries or currant bushes, or what sometimes pay equally well, filberts. The latter are not allowed to rise higher than about four feet, and are kept spurred in, exactly like the white currants. Gooseberries gathered green for tarts pay the farmer better than when ripe, and are not nearly so troublesome in the carriage to market. As such an orchard is not to be grazed, two feet of the soil on each side of the rows is kept bare, and always free from weeds. On this a quantity of rotten dung may be laid every winter, and raked off in the spring, upon the intermediate strips of ground to be planted with potatoes, or sown with onions, turnips, scarlet runners, or any other crop which the cultivator can most advantageously dispose of in his neighborhood. The earliest and surest bearing apples should be preferred. A few of the earliest pears may be mixed, as the Petit Muscat. The most hardy and profitable kind of plum for a farm orchard is the common damson, it being always in request for baking, preserving, or for wine making.—[Jour. Agr.]

Transactions of the Agricultural and Horticultural Society of India. 8vo. Vol. I., 1829, Serampore. Vol. II., Part I., 1832, Calcutta.

Our readers probably will not find the following review, from Loudon's Magazine, foreign to their taste, nor destitute of interest.

There is a well-written prospectus, by Mr. W. Carey, the missionary, who first suggested the idea of an Agricultural Society of India, and who is now secretary to it. In this, the advantages of co-operation, and of joint-stock information and experience, are ably pointed out. The good done by the agricultural societies in England is referred to; and the most beneficial results, as respects the peasantry, the landowners, and the Europeans, who engage in agriculture in India, are anticipated from the institution proposed. To give some idea of the present state of agriculture in India, it is stated that, in many parts of the country, the same crop is invariably raised on the same ground year after year; hay is never cut till the grass has died or withered where it grew; scientific rotation of crops is a subject to which Indian cultivators are strangers; and the manure produced by animals is generally consumed for fuel. No attempt to improve live stock appears to have been ever made in India; though there is every reason to believe that all the animals used in the husbandry of Europe are capable of as high a degree of improvement in India as they are in more temperate regions. The quantity of waste lands in India is said to be so large as almost to exceed belief. Extensive tracts on the banks of numerous rivers are annually overflowed, so that they produce little except long and coarse grass, seldom turned to any useful account. During the rainy season these tracts are the haunts of wild buffaloes, which in the night come up from them and devour the crops of rice on the high lands. In the cold season, wild hogs, tigers, and other noxious animals, unite with the buffaloes in occupying these extensive tracts of alluvial soil; which, though now so pernicious, might, by embanking and draining, become the richest lands in the country, and contribute greatly to the improvement of the climate. Similar observations might be made respecting immense tracts now wholly covered with wood, and producing nothing whatever to civilised man; but, on the contrary, proving a nuisance to the surrounding districts, by affording a shelter to noxious animals. The oppression of landowners and petty officers on the cultivator is so great, that in some parts of the country no farmer can reasonably promise himself security for a single night. "Thus," concludes Mr. Carey, "one of the finest countries in the world, comprising almost every variety of climate and situation, diversified by hills and valleys, intersected in every part by streams, (most of which are navigable six months in the year, and some of them through the whole year afford every facility for carrying manure to the land and every part of the produce to market,) is, as far as respects its agricultural interests, in a state the most abject and degraded." (p. x.) This is a most forbidding picture; but it is incident to all countries in a particular stage of their progress in civilization. Time was, when the low districts of England were ravaged by the wolves and bears from the mountain forests, and when the crops on the alluvial vales of her rivers were annually swept away, or at least greatly injured, by floods. As to oppression by superiors, and thieving from others, there will always be abundance of such evils, till mankind are brought to something like equalization in point of knowledge, and consequently power; till, in short, the mass of society becomes fit for self-government.

Gardening, we are next informed, is in almost as low a state as agriculture. "Except in the gardens of certain Europeans, who at a great expense procure a few articles for the table, there is nothing to be met with besides a few wild herbs, or garden productions of the most inferior kind. All that is seen of orchards amounts to no more than clumps of mango trees crowded together without judgment; and in which the quality of the fruit is but little consulted. The improvement of fruits is almost neglected, and every thing which can contribute to the furnishing of our tables with wholesome and agreeable vegetables and fine fruits is yet to be commenced; not to mention that ornamental gardening is scarcely known. We depend upon Europe for seeds, of which, when we have obtained them at a great price, scarcely one in five hundred vegetates, and, even after it has sprung up, seldom comes to perfection, through the ignorance or negligence of the native gardeners. It is, notwithstanding, well known that one part or other of India would suit every production, and bring every kind of seed to maturity; so that, by a free communication, those parts of the country in which the seeds of particular plants do not come to perfection might be easily supplied with them from others, and useful plants and fruits might be gradually acclimated, so as to be plentiful in every part of India. The introduction of the potato, and more recently of the strawberry, are sufficient to show that the attempts of insulated individuals have not been

in vain. How much more then might be accomplished by the joint efforts of a number of persons arduously engaged in the same pursuit!" (p. xi.)

This deplorable state of things Mr. Carey proposed attempting to improve, by the establishment of a Society which should give premiums, and publish reports; raising the funds necessary for that purpose by subscription. The Society was formed in 1820, and, after having held several meetings, a number of premiums were given, for the first time, at a meeting held in January, 1827; and the work before us includes the reports that have hitherto been made to the Society; or, rather, the papers which have been contributed to its Transactions.

To give an idea of the articles exhibited at these meetings for competition, we may mention that, at the first meeting, (in January, 1827,) at which prizes were distributed, the articles produced were chiefly of European garden produce; such as peas, cabbages, turnips, cauliflowers, beets, mangoes, guavas, kohl rabi, red cabbage, and potatoes. The silver medal was awarded to Yusuf Malee, of Moochee-khola, for the best potatoes raised from Cape sets. The cabbages weighed from 20 to 24 lb., and were 10 in. in diameter. The cauliflowers weighed from 6 to 8 lb., and were about 8 inches in diameter; the kohl rabi 3 lb., and 5½ inches in diameter; the turnips 2 lb., and 6 inches in diameter; and the potatoes were 3½ inches long. (App. p. xxxvii.)

We shall now look over the different papers which compose the Transactions, and shall select what we think will be most interesting or useful to our readers. In the introductory discourse, by the president, W. Leycester, Esq., we think the good produced by the British Board of Agriculture is greatly overrated. Instead of going to the root of the evils of British agriculture, and directing its attention to the removal of tithes, of injurious restrictions in leases, and similar political obstacles, and striking at the general ignorance of farmers, the British Board of Agriculture limited its exertions to publishing books, most of them at so high a price that they never fell into the hands of those for whom they were intended. We question much whether the Agricultural Society of India durst venture to propose to diffuse knowledge among the native agriculturists by educating their children. If they dare do this, they may rest assured, from the negative results of the agricultural societies of Britain, that it is the only effectual mode of really improving agriculture or gardening. A certain degree of knowledge is necessary to enable cultivators to make the improvements pointed out to them their own: this degree was not possessed by the great majority of the farmers of England, when the Board of Agriculture was in activity, and it is much less likely to be so in India. The consequence, in England, has been, that, in many districts, agriculture is scarcely, if at all, advanced beyond its state in the year 1790, before the Board of Agriculture was established. The same tenures from year to year; or, if a longer tenure, the same leases, prescribing the same courses of crops which were practised centuries before; the same ploughs, carts, and waggons, and the same heavy horses—may still be seen by the tourist. In agriculture, therefore, as in all matters which concern the improvement of the practices of great masses of society, to do good effectually, it is necessary to begin with a general system of education for youth. Let this be done in every district throughout India; connecting, with every school that is established, a garden and a circulating library; and teaching, in addition to the language of that district, the English language, weights, measures, and moneys; if this were done, the system of culture, both in fields and gardens, would in one generation be placed in a state to receive every improvement of which it is susceptible. But how can we suppose that this is to be attempted in India, when we know very well that the object of the rulers is not to improve the people, but to turn them to their own account? We must leave the matter, therefore, to Providence, and expect nothing more from this Society than from others similarly established and circumstanced.

Art. iv. contains answers by Mr. Stirling to a number of queries circulated by Mr. Carey, in one of which allusion is made to the celebrated school at Hofwyl, in Switzerland, "as a proper model for any schools which may be hereafter instituted in this country, (India,) in the establishing of which the Society may possess sufficient influence." "I cannot conceive," says Mr. Stirling, speaking of the establishment of such schools in India, "any measure which would tend so much to the production of universal improvement." (p. 43.) We are happy to find such sentiments entertained even by a single individual.

In Art. v., preserving seeds in phials of bran, or charcoal, packed in cotton, is recommended; a specimen being present in October, 1821, of turnip seeds capable of vegetating, which had been sent from Scotland in March, 1820.

Art. vi. describes a mode of flute-grafting practised in India, apparently from time immemorial. It differs from the flute-grafting of Europe in not taking off the ring of bark from the stock, which is to be replaced by the ring from the scion, but in peeling it down in shreds; and, when the scion ring is put on, bringing the different shreds of bark up again over the newly introduced ring, and uniting them at top over the cross section of the stock, under a piece of clay. It is evidently a less perfect mode than the European, since the bark so brought up can never unite either with the scion or with the stock. (p. 47.)

In Art. xvi. it is shown that good hemp may be prepared from the different species of Musa and Yucca.

Art. xix., "On the fruit trees of Cashmere and the neighboring countries," is of considerable interest. The fleshy and pulpy fruits are apples, pears, quinces, peaches, apricots, plums, cherries, and mulberries. The shell and stone fruits are pomegranates, walnuts, and almonds. There are many varieties of grape vines, both of exotic and of indigenous origin; and, while the country was under Hindoo rule, much wine was made, and some brandy distilled. No mulberry of Europe, or of Lower India, equals the sweet varieties of Cashmere. They are eaten ripe, or made into wine, vinegar, or spirit. An immense quantity of oil and oilcake is made from the walnut, and the wood of the tree is said to equal that of Britain for gunstocks. It is calculated that Cashmere would supply as much walnut oil as would furnish gas enough to light all Britain. A situation between Cashmere and British India is pointed out as eligible for a nursery, in which the native fruits of both countries, and newly-introduced fruits from Europe, might be propagated and improved.

"This is the Shahlomer, or garden of Pingower, made by Fiddee Khan, the son of Uleemurdem Khan, both formerly governors of the province of Cashmere. A wall of well-constructed masonry, in good repair, completely encloses an area of very considerable extent. This area is divided into five terraces, separated by breastworks of stone masonry, and descending to the south. Through the middle of this garden, led by a canal lined with stone, decends a considerable stream of clear, well-tasted, and cold water, which, by means of trenches, of simple structure and arrangement, at right angles with the main trunk, can be so diffused as speedily to flood the whole surface of the terraces. This area at present contains only one large lemon tree, some Lombardy poplars, a few rose trees, five or six parterres of poppies, and larkspurs, and about half a dozen brood mares. It has upon it two small but neat houses, with apartments for servants, near the gate, and the whole is in good repair." (p. 85.)

In this article, the floating gardens of Cashmere, (Encyc. of Gard. n. edit. § 1391,) are described; and it appears that the cucumbers and melons grown in them are neither very large nor very well flavored. At a distance, the smaller of these gardens appear like haycocks; one melon or cucumber plant growing on the summit, and spreading down the sides; the larger are like narrow ridges of dung made up for growing mushrooms, with rows of cucumbers or melons along the top. The floating gardens are frequently collected together in a sort of fold, and surrounded by a floating fence, having a boat-way, which is opened only at particular times. Floating gardens of great extent are sometimes stolen during the night, and being towed a considerable distance, and anchored along with others of a similar character, it is difficult for the owner to recognise his property. To prevent these robberies, folds of floating gardens are generally watched during the night.

Art. xxii. contains the method of treating grape vines at Bombay; in which the chief thing worthy of remark is the mode of giving them a kind of artificial winter. This is done by laying bare the roots after the rainy season, so as to check vegetation. They are laid bare about the 7th or 10th of October, and are allowed to remain exposed for 15 or 16 days. The vines are then pruned, and in about a week afterwards, it is observed that the buds are beginning to break; the roots are then recovered with the soil mixed with manure, and water is given to them every morning and evening till the fruit attains its full growth. They are afterwards watered every third or fourth day, till the grapes are completely ripe. It thus appears that the length of the winter given to the vine in Bombay is about 26 days, which may perhaps afford a useful hint to the British forcing gardener. It does not appear that the produce of the vines in Bombay is very great, but the gardeners have no difficulty, by means of wintering different plants in succession, in having ripe grapes every day in the year.

Art. xxiv. is a translation from a native gardening work full of receipts for rendering plants fruitful, flowers fragrant, and for changing their colors, &c. There is scarcely one of these receipts that is not perfectly absurd; for example: "To cure all diseases of vegetables, make a smoke in the field, with cows' and cats' bones, and cats' dung," (p. 141;) though the results proposed may sometimes be accounted for by the check given to the returning sap.

Art. v., Vol. II., is on the mango and peach trees. "No fruit in India is held in such estimation by the whole mass of its population, from Delhi to Cape Comorin, as the mango." The peach, though a fine fruit, is comparatively little valued. The mango is allowed to be extremely wholesome and nutritious. There are a great many varieties of mangoes to be found in the orchards of India; but, like the peaches in the American orchards, they have been generally raised from seeds sown on the spot, and the majority of them are of very inferior quality.

In Art. vii. it is stated, that, in order to have good and early crops of cauliflowers, cabbages, peas, turnips, &c., it is absolutely necessary to sow only seed which has been raised in the country. For late crops, that which has been raised at the Cape of Good Hope, or Van Diemen's Land, is found best. European seeds should be chiefly used for producing plants as stock from which to raise seed in India. There are some papers on the culture of indigo and sugar, and one on the cultivation of the teak, which we have not space to enter on. The growth of the teak is said to be rapid, and the wood at all ages is found excellent. In these and other respects it is said to have greatly the advantage of the British oak. A teak board, however, is sometimes consumed in a single night by the species of insect popularly called the white ant.

ABSTRACT OF THE PROCEEDINGS OF THE NEW-YORK LYCEUM OF NATURAL HISTORY.—The proceedings of this scientific association should be more familiar to the public. We hope to give, in future numbers of the Farmer, a popular sketch of the transactions, and, with this view, commence with the following, from the Journal of Science.

It may be proper here to state, that although, owing to circumstances which have threatened the existence of the society, the Lyceum has not published its annals since 1828, nor any abstract of its proceedings since 1830, its members have by no means relaxed from their former exertions for the promotion of Natural History. The library and collections of the various departments have been greatly augmented, as will be seen by the following abstracts. The collection of minerals, from private donations, and especially that of the valuable cabinet of the late Dr. Mitchill, and from the replacement of inferior by more perfect specimens, has been very greatly augmented and improved. Ample matter has been collected for the future numbers of the Annals, one of which, it is hoped, will soon appear. We may indeed affirm, that the Lyceum was never in a more flourishing condition than at the present time. The rooms, situated at the corner of White and Centre streets, are open daily from 12 o'clock until sun-set, where the librarian and keeper will be present to welcome all visitors who are interested in the promotion of natural history.

ABSTRACT FOR 1831.

January.—Dr. Dekay read a paper, entitled "Examination of the facts and arguments by which it is attempted to be proved that lava has not been subjected to great elevations of temperature." In this memoir, the author, avoiding any decided hypothesis, confines himself to the examination of the heat of volcanic lava, and endeavors to show that the arguments by which the doctrine of low temperature had been defended were opposed by numerous facts; at the same time, he explains on different principles the few facts by which the idea of low temperature appears to be supported.

Dr. Dekay read a paper on the propriety of preparing a Natural History Catalogue of the region within thirty miles of the city of New-York. The subject was referred to a committee, upon whose recommendation the following gentlemen were appointed to arrange the catalogue.

President Delafield, on minerals; Professor Torrey, phenogamous plants; Mr. Halsey, cryptogamous plants and arachnides; Dr. Dekay, zoophytes, fishes, mammalia, and annelides; Major Leconte, insects; Mr. I. Cozzens, crustacea; Mr. Cooper, mollusca, reptiles, and birds.

February.—Professor McVickar presented, among other minerals, specimens of anthracite from the Great St. Bernard, found at a height of one thousand feet above the Convent, (Hospice.)

At the anniversary meeting, on the 28th inst., the following officers were elected for 1831:

President, Joseph Delafield; 1st Vice-President, Abraham Halsey; 2d Vice-President, Dr. J. E. Dekay; Corresponding Secretary, Dr. J. Van Rensselaer; Recording Secretary, Dr. J. J. Graves; Treasurer, Wm. Cooper; Librarian, Dr. J. E. Dekay.

March.—Mr. Cooper read a notice of several birds seen by him in the neighborhood of the city of New-York during the past winter, which he stated were not usually noticed at that season. The same gentleman read a communication from Major Leconte, stating that he had recently discovered two new species of Unio, and had heard of four others, one of which is spinous. In plants, he had discovered a new species of Thymus, and a new genus allied to Gerardia.

May.—Mr. Cooper, from the committee on the catalogue, read a report on the birds in the vicinity of the city of New-York, accompanied by a catalogue of the species, with preliminary remarks on their migration and geographical distribution.

Mr. Cooper stated that the large collection of bones recently disinterred at Big Bone Lick, Kentucky, were then in the city, and belonged to Messrs. Barber and Graves—that it contained fourteen or fifteen tusks, ten or eleven lower jaws, and a skull, nearly perfect, (of the Mastodon,) with a large quantity of bones, stated to belong to nearly 20 different species, forming a variety and extent unrivalled, as follows: bones and teeth of fossil elephant, mastodon, horse, ox, deer, and megalonyx; of the latter genus, parts of the right lower jaw with four teeth, a separate tooth, clavicle, tibia? and perhaps other portions now for the first time discovered as belonging to that animal. (The report, relating to these bones, and presented to the Lyceum, was subsequently published in this Journal.)

September.—The President announced the death of their late member, Dr. Samuel L. Mitchill, whereupon, a resolution, expressive of the feelings of the Lyceum, and of the loss which science in general had sustained, was unanimously passed by the Society. A resolution was also passed, that Dr. Samuel Akerly be requested to draw up a biographical memoir of the late Dr. Mitchill.

November.—Dr. Gale exhibited for inspection specimens of several different alloys of sodium and potassium, a number of which were liquid at the ordinary temperature, (60° Fah.;) one, containing 12 parts of potassium and 1 of sodium, was so light as to float on naphtha, and congealed at the freezing point of water. Dr. G. stated, that this alloy was a remarkable instance of expansion, from the union of two different bodies, and that from the liquidity of the alloy, we should infer, according to the laws of caloric, that much heat would have been absorbed, and consequently a considerable diminution of temperature would follow; on the contrary, an elevation of temperature was the consequence of the union.

During the present year many valuable donations have been received, and the following gentlemen elected as members:

Resident—S. T. Carey, Dr. Thomas D. Devan, Benjamin Pike.

Corresponding—Wm. R. Clapp, Philadelphia; Professor Dobereiner, Jena; Professor Breithaupt, Freiburg; Mr. M'Gillivray, Edinburgh; Don Claudius Gay, Valparaiso.

ABSTRACT FOR 1832.

January.—Dr. Perrine, U. S. Consul at Campeachy, read a paper of an article used in the manufacture of cordage, and brought to our market under the name of Sisal Hemp. It is stated, by the author, to be a species of Agave, (Agave Americana,) growing wild in great abundance in Yucatan.

Professor Torrey read a paper from the Rev. L. De Schweinitz, entitled "Remarks on European plants, which have been more or less naturalized in the United States."

Mr. Cooper communicated a paper on the anatomy of the Wild Swan, (Cygnus Bewickii,) of Long Island, and exhibited parts of the skeleton of this animal.

Dr. Feuchtwanger read a paper on Lucullite or black marble.

Dr. Akerly exhibited for inspection numerous relics from a temple in the ancient city of Palenque, in Central America.

February.—At the anniversary meeting, on the evening of the 27th inst., the following gentlemen were elected officers of the society for 1832:

President, Joseph Delafield; 1st Vice-President, Abraham Halsey; 2d Vice-President, J. E. Dekay; Corresponding Secretary, Dr. J. Van Rensselaer; Recording Secretary, Dr. L. D. Gale; Treasurer, Wm. Cooper; Librarian, James E. Dekay.

March.—Professor Torrey read an interesting communication from Dr. Johnson, of Chiapas, on the history of the Mexican Albinos, and was requested to forward the communication to Professor Silliman for publication.

April.—Dr Gale read a paper, entitled "Observations on the bases of the alkaline earths, earths proper, new method of separating some of these bases, and on the new metals, Thorium, Pluranium, Ruthenium, and Vanadium.

Dr. Dekay read a paper on the volcanic islands which appeared in the Mediterranean, in 1831.

May.—Dr. Harlan, of Philadelphia, presented a variety of casts of the fossil Megalonyx, chiefly from White Cave, Kentucky, most of them unique and highly interesting specimens. Mr. Cooper made some verbal remarks on these fossils, and demonstrated the osteology of the parts hitherto known.

June.—Mr. J. Finch gave an account of some geological observations made by himself on the region in the vicinity of Lake Erie and the River St. Lawrence, in which he pronounced the basin of those regions to be principally *tertiary;* he also gave an account of the columnar limestone found in the vicinity of Kingston, U. C., and on the Island of Montreal.

Mr. D. J. Browne, of Boston, announced a locality of *Fulgorite*, at Gurnet's Point, near Duxbury, Mass., being the first locality noticed in the United States.

October.—Dr. George W. Boyd read a paper entitled, "Observations on the Mineralogy and Geology of the gold region of the southern United States," and also presented an extensive suite of characteristic specimens. Dr. B. considers this region decidedly *primitive*, and also that the *auriferous deposites* have no connection with the *veins* at present worked.

Mr. Dewey reported on the Geological Text Book of Professor Eaton, in which he stated, that although the work contains many valuable facts, yet for a text book he considers the arrangement a bad one.

November.—Mr. Sampson read a paper on a cetaceous animal, (Delphinus Globiceps,) lately stranded on Fairfield beach, state of Connecticut, of which Mr. John I. Glover gave a sketch and description at a former meeting.

The President read a communication from John E. Holbrook, M. D., Professor of Anatomy and Physiology in the Medical College of Charleston, S. C. stating that he proposes publishing a work on the Herpetology of S. Carolina and Georgia.

December.—Dr. Feuchtwanger read a paper, entitled "Observations on Nickel, and its application in the preparation of the new metal, Argentine or New Silver," in which he described most of the ores of Nickel, and the various modes of reducing them.

Dr. Dekay presented a suite of specimens illustrative of the geology of the island of Mytilene, the Dardanelles, the Bosphorus, the neighborhood of Smyrna, and the Asiatic shores of the Black Sea, accompanied with observations.

Numerous donations in nearly all the branches of Natural History have been received from members and correspondents.

The following gentlemen have been elected as members during the present year:

Resident—Dr. Wm. Baxter, Dr. R. P. Tanner, Dr. J. C. Jay, Wm. F. Deming, Dr. J. M. Leon, Frederick Prime.

Corresponding—Alonzo Clarke, Williamstown, Mass.; Dr. H. Perrine, Campeachy; Counsellor Dr. Keugg, Berlin; Capt. F. A. Fokkes, Hamburg; George Gibbs, jr. Turks Island; Professor Naccari, Chioggia, Venet. Terr'y; Col. Ed. Clarke, Saugerties, N. Y.

ABSTRACT FOR 1833.

January.—Dr. Dekay read a paper on the Gaviel of New-Jersey, of which he exhibited

to the Society a considerable portion of a lower jaw discovered there by Lieutenant W. W. Mather, of West Point, from whom he also read a letter communicating some geological observations on this region.

Mr. Cooper read a report on the specimens of Megalonyx referred to by him at a previous meeting. They consisted of several phalanges of the fore foot, and there is reason to presume that they formed part of the original specimen made known by Mr. Jefferson.

February.—At the anniversary meeting, held on the 25th instant, the following gentlemen were elected officers for 1833:

President, Jos. Delafield; 1st V. President, Abm. Halsey; 2d V. President, John Torrey; Corresponding Secretary, Dr. Jeremiah Van Rensselaer; Recording Secretary, Dr. Jas. E. Dekay; Treasurer, Wm. Cooper; Librarian, Dr. J. C. Jay.

April.—Mr. Cooper read a communication from Professor Troost, of the Nashville University, entitled, "Description of a new genus, Acontia, and of two new species of Heterodon, accompanied with drawings.

Under the genus Acontia, the author describes two species, viz.:

Acontia leucostoma, or Cotton Mouth, with poisonous fangs.

Acontia atrofuscus, Highland Mokeson, Copper Head, Pilot, &c.

Under the genus Heterodon the author enumerates 3 species, viz.:

Heterodon niger of Beauvais.

Heterodon annulatus of Troost, inhabits swamps.

Heterodon tigrinus of Troost. All of which are found in Tennessee.

Dr. Gale read a report on Dysodile or mineral paper, presented at a former meeting by Capt. Perry, and referred to Dr. Gale for examination and report.

May.—Dr. Samuel L. Metcalf read a paper entitled, "A New Theory of Terrestrial Magnetism," in which he maintains, 1, the identity of caloric and electricity; that atmospheric electricity or lightning results from the accumulation of caloric in aqueous vapor, and from its rapid passage out of vapor into bodies which contain less of it. 2, that galvanic electricity is produced by the oxidation of metallic plates in acids or alkalies; that its properties vary according to the size and number of the metallic plates, and the rapidity of their oxidation. 3, that common electricity is derived from the atmosphere, and from other bodies, by pressure, and by friction; in short, that the latent caloric of all bodies is convertible into heat or electricity, according to the mode of its disengagement from other matter.

He further maintained, that caloric is the cause of all the powers and motions of other matter; that it is the combining force in cohesive and chemical affinities; that it is the cause of capillary attraction, and of gravitation; that it is the cause of light, by expanding common matter into a state of extreme diffusion, until it becomes phosphorescent and imponderable. He also maintains that the aurora borealis is produced by the caloric which is given out by the upper current of the atmosphere, as it passes from the tropical to the polar latitudes, by which it is greatly condensed; and further, that caloric is the source of *all life* and motion throughout creation.

In part II. he endeavored to show, that magnetic polarity was caused by the passage of radiant caloric from the tropical to the polar latitudes, because the force of magnetic power coincides with the coldest points in the polar regions. He maintained from numerous analogies, that if the whole earth were of uniform surface and elevation, the true north and south poles would be the centres of the greatest cold, and of magnetic action, and that there would be no variation of the needle; but that, from the varied distribution of land and water, mountains and plains, they followed a corresponding variation of territorial temperature in the same latitudes, which was also accompanied by a corresponding variation of the needle. He maintained that the unusual accumulation of ice in the polar seas caused a shifting of the magnetic poles; that they are further north during summer than winter; that their movements are sometimes eastward, and at other times westward, but not uniformly so. He further showed, that all the variations of the needle, annual, monthly, and diurnal, uniformly obeyed the variations of terrestrial temperature. He has identified all the phenomena of magnetism with the fundamental doctrines of climate; and the whole work may be considered as an attempt to resolve all the motions and changes which take place throughout nature into the agency of a simple and universal element. He considered the relations of caloric to ponderable matter as the basis of the whole structure of physics.

This treatise has been since published under the above title.

July.—Mr. Partridge exhibited specimens of pink-colored silk, dyed by the flowers of the Monarda didyma, or sweet balm.

August.—Dr. Swift, U. S. N., exhibited some new and singular reliques recently disinterred from the ancient city of Palenque in Central America.

September.—Dr. Akerly read a communication, entitled "Extracts from a correspondence of Don Francisco Corroy of Tobasco, in relation to the antiquities of Palenque."

Many valuable donations have been received by the Society during the present year, of which are mentioned a large box of interesting Swedish minerals, received from H. Wheaton, Esq., Charge d'Affaires from the U. S. to the Court of Denmark; and also a box of minerals, marine and fresh water shells, and Corallines, from H. Perrine, Esq., U. S. Consul at Campeachy.

The following gentlemen have been elected as members during the present year:

Resident—Jos. Foulke, jun., Dr. Edward Ludlow, Dr. William Edgar, Dr. S. L. Metcalf, Dr. Minturn Post, J. M. Bradhurst, Hen. C. Brush, Rufus Prime, William Partridge, R. H. Brown, Dr. W. C. Wallace.

Corresponding—M. V. De Meleon, Paris; Dr. Thos. Dillard, U. S. N.; Dr. J. Finch, London; Don Francisco de Corroy, Tobasco; Dr. A. Adee, U. S. N.

Influence of the Moon on the Weather; Substance of a Paper read at the Natural History Society of Geneva, in October, 1833, *by* F. Marcet.

On the question whether the moon has any influence over the weather or not, there are two opposite opinions; the great mass of the people, including sailors, boatmen, and most practical farmers, entertain no doubt whatever of the influence of the moon; whether the change of weather at the lunar phases will be from fair to foul, or from foul to fair, none of them pretend to decide beforehand, but most of them think, that at the new and full moon there is generally a change of some kind. On the other hand, philosophers, astronomers, and the learned in general, attribute this opinion altogether to popular prejudice. Finding no reason, in the nature of atmospheric tides, for believing that changes should take place on one day of the lunation rather than another, they consider the popular opinion to be unsupported by any extended series of correct observation.

In the Annuaire for 1833, Arago, the learned editor, has presented the result of the observations of Schubler, in Germany, during 28 years, or 348 synodic revolutions of the moon. During this period of 348 new moons, &c. the number of rainy days was as follows:

It rained on the day of the new moon 148 times.

Do.	do.	first quarter	156 "
Do.	do.	full moon	162 "
o.	do.	last quarter	130 "

The observations of Schubler were made, during 8 years, at Munich, 4 years at Stuttgard, and 16 years at Augsburg.

As a good meteorological register has long been kept at Geneva, the author thought it would be interesting to ascertain from the tables, (which have been carefully published in the Bibliotheque of that city,) whether, during a period of 34 years, viz. from 1800 to 1833, any inferences could be drawn for or against the popular opinion on the subject of lunar influence. He finds, during these 34 years, the number of rainy days and the quantity of water fallen to be as follows:

	Rainy days.	Water fallen.
At the New moon,	123	432 lines.
First quarter,	122	429.6 "
Full moon,	132	415.7 "
Last quarter,	128	368.6 "
The whole period,	3,657	968 in. 9.3 "

Thus it appears, that during 34 years, or 12.419 days, comprehending 420 synodic revolutions of the moon, there have been 3,657 rainy days. This gives, for every 100 days, 29.45 rainy days, and we find, that for every 100 days of new moon, 29.29 have been rainy.

Do.	do.	first quarter,	29.05	do. do.
Do.	do.	full moon,	31.43	do. do.
Do.	do.	last quarter,	30.48	do. do.

Hence, it is evident, that during these 34 years at Geneva, the days of new moon and the days of the first quarter have been just about as liable to be rainy days as any other common day of the month, while the days of full moon and those of the last quarter have been *rather* more liable.

But although the days of full moon have been rather more frequently wet days than those of new moon, it does not follow that more water has fallen at full moon than at the change. The result of observation in that respect is as follows:

For every 100 days of new moon there fell 102.9 lines.

Do.	do.	first quarter,	do.	102.3 "
Do.	do.	full moon,	do.	90.0 "
Do.	do.	last quarter,	do.	87.9 "

The average quantity for every 100 days is 93.6 lines, whence it appears, that at the new moon, the first quarter, and the full moon, more water has fallen than on common days; at the last quarter, less. The quantity fallen on the total of the lunar phases surpasses that on other days in the proportion of 98 to 93.6.

Another question is, whether a *change of weather* is more liable to happen on the four principal days of the lunar phases than on common days. But it must be decided what is meant by the term change of weather. This term should, the author thinks, be limited to a change from clear weather to rain, or from rain to clear weather, and not be understood to include, as some meteorologists make it, all changes, such as that from calm to windy, or from clear to cloudy, &c. As the author accepts it, the weather must have been steady during two days at least; that is, that the weather has been clear, or that it has rained more or less during two consecutive days. For example, a week has passed without rain; it rains on the eighth day; and on the ninth the weather is again fine. In this case, according to the author's definition, there is no change of weather. So, also, if it has rained during five successive days, the sixth and the seventh must be clear, in order to constitute a change of weather. This may be arbitrary, but at least it is not vague, and if practised it will prevent, in the balancing of calculations, any leaning to a favorite hypothesis. To avoid another error, into which some have fallen, the author marks no change as occurring on lunar phases but those which take place on the very day, and never those which may happen on the evening before or on the next day.

With these precautions he finds that during the 34 years, or 12,419 days, there have been 1458 changes of weather. Of this number, 105 have taken place at the epoch of the two

principal lunar phases, viz., 54 at the new moon, and 51 at the full moon. Now the whole number of principal phases during the 34 years is 840, therefore,

As 12419 : 849 : : 1458 : 98.6, the number of changes which would have taken place at new and full moon, had these lunar phases had no more than the share of common days, but, instead of which, the number was 105.

Of the 54 changes at new moon, 32 were from rain to fine weather, and 22 from fine weather to rain. Of the 51 at full moon 31 were from rain to clear, and 20 from clear to rain. Thus at the new and full moon, the changes to fine weather are to those to rain as 63 to 42.

Having thus proved that the epoch of new and full moon is not absolutely without some effect on the weather, the author examined whether this effect was confined to those very days, or extended to the day following. On the days following the new and full moon, there were 129 changes, instead of 98.6, which would have been the number had these shared the proportion only of common days.

With respect to the days of the first and last quarter, the changes on these were 96, which bring them nearly to the condition of common days.

It is thus shown from the tables, that the chance of a change at new and full moon, compared with the chance on ordinary days, is as 125 to 117, and that the chance on the day following these two phases, compared with the common days, is as 154 to 117.

Upon the whole, therefore, this examination lends some support to the vulgar opinion of the influence of new and full moon, but none whatever to any especial influence of the first and third quarters.

With respect to *barometrical pressure*, it is ascertained that out of the 1458 changes of weather, there were in 1073 cases a corresponding rise or fall of the barometer, according as the change was from rain to fair, or the contrary. This is nearly as 3 to 4. Of the 385 false indications of the barometer, 182 were on a change from rain to clear, and 203 on a change from clear to rain. Finally, of the 385 anomalies of the barometer, 17 were at full moon, and 10 only at new moon.—[Bib. Univ. Feb. 1834.]

CAPITAL IN FARMING.—It is too common an opinion in this country that little or no capital is required in farming. This is a great mistake, if any thing more than plodding is to be done. In agriculture, as well as in the mercantile business, there are times when a capital can be laid out very advantageously. The following is from Sir John Sinclair.

It is indispensable for the success of every undertaking, that a sufficient capital to carry it on should be at command; and for that of farming, in particular. When there is any deficiency with respect to that important particular, the farmer cannot derive sufficient profit from his exertions; for he may often be obliged to dispose of his crops at an under value, to procure ready money; or he may be prevented from purchasing the articles he may require, though a favorable opportunity may present itself. An industrious, frugal, and intelligent farmer, who is punctual in his payments, and hence in good credit, will strive with many difficulties, and get on with less money, than a man of a different character. But if he has not sufficient stock to work his lands properly, nor sufficiency of cattle to raise manure, nor money to purchase the articles he ought to possess,—he must, under ordinary circumstances, live in a state of penury and hard labor; and on the first unfavorable season, or other incidental misfortune, he will probably sink under the weight of his accumulated burdens. In general, farmers are apt to begin with too small a capital. They are desirous of taking large farms, without possessing the means to cultivate them. This is a great error; for it makes many a person poor upon a large farm, who might live in comfort, and acquire property upon a small one. No tenant can be secure without a surplus at command, not only for defraying the common expenses of labor, but in case any untoward circumstance should occur. When a farmer, on the other hand, farms within his capital, he is enabled to embrace every favorable opportunity of buying with advantage, while he is not compelled, if the markets are low, to sell with loss.

The amount of capital required must depend upon a variety of circumstances; as 1, Whether it is necessary for the farmer to expend any sum in the erection or in the repair of his farm-house and offices; 2, What sum an incoming tenant has to pay to his predecessor, for the straw of the crop, the dung left upon the farm, and other articles of a similar nature; 3, The condition of the farm at the commencement of the lease, and whether any sums must be laid out in drainage, enclosure, irrigation, levelling ridges, &c.; 4, Whether it is necessary to purchase lime, or other extraneous manures, and to what extent; 5, On the term of entry, and the period at which the rent becomes payable, as this is sometimes exacted before there is any return from the lands out of the actual produce of which it ought to be paid; and, lastly on its being 1, a grazing, or 2, an arable farm, or 3, a mixture of both.

1. *Grazing Farms.*—In pasture districts, the common mode of estimating the amount of capital necessary is according to the amount of the rent; and it is calculated that, in ordinary pastures, every farmer ought to have at his command from three to five times the rent he has agreed to pay. But in the more fertile grazing districts, carrying stock worth from £30 to £40 per acre, (as is the case in many parts of England,) five rents are evidently insufficient. When prices are high, ten rents will frequently be required, by those who breed superior stock, and enter with spirit into that new field of speculation and enterprise.

2. *Arable Farms.*—The capital required by an arable farmer varies, according to circumstances, from £4 4*s.* to £10 or £12 per English acre. An ignorant, timid, and penurious farmer lays out the least sum he can possibly contrive; and thence obtains the smallest produce or profit from his farm. These, however, will always increase, when accompanied by skill, spirit, and industry, in proportion to the capital employed, if judiciously expended. At the same time, attention and economy cannot be dispensed with. It is ill-judged to purchase a horse at sixty guineas, where one worth thirty can execute the labor of the farm; or to lay out sums in expensive harness, loaded with unnecessary ornaments. Prudent farmers also, who have not a large capital at command, when they commence business, often purchase some horses still fit for labor, though past their prime, and some breeding mares, or colts; and in five or six years, they are fully supplied with good stock, and can sometimes sell their old horses without much loss. In every case, such shifts must be resorted to, where there is a deficiency of capital.

3. *A mixture of Arable and Grass Farming.*—This, on the whole, is the most profitable method of farming. Independently of the advantages to be derived from the alternate husbandry, (which are always considerable,) the chances of profit are much more numerous, from a varied system, than where one object is exclusively followed. Where this mixed mode of farming is practised, the farmer will frequently rely on the purchase of lean stock, instead of breeding his own; and derives great advantage from the quickness with which capital thus employed is returned. But, in that case, much must depend upon judicious selection.

It is not necessary to enter into any detailed estimates of the capital required for stocking arable or mixed farms, as they have been already detailed in former publications. In general, it may be said, that to stock a turnip land arable farm will require, at this time, from £5 to £6, and a clay land farm from £7 to £8 per English acre.

This capital is necessarily divided into two parts. The one is partly expended on implements, or stock of a more or less perishable nature, and partly vested in the soil; for this the farmer is entitled to a certain annual gain, adequate to replace, within a given number of years, the sum thus laid out. The other is employed in defraying the necessary charges of labor, &c. as they occur throughout the year; the whole of which should be replaced by the yearly produce. These two branches of expense on a farm are the first to be attended to, both in order of time and in magnitude of amount.

The most satisfactory statement hitherto given, of the profit derived from the expenditure of an adequate capital in arable farming is that furnished by George Rennie, Esq. of Phantassie, in East Lothian. On a mixed soil of 702 English acres, he states the profits at £1 5*s.* per English acre, or about 14 per cent. on the capital employed. On this subject, it has been well observed, that unless something commensurate to their skill, capital, and industry, is made by intelligent and industrious farmers, it would injure both the proprietors of land and the public. Adventurers, who possess but little capital, would occupy the farms, probably at too high rents; they would exhaust the soils, instead of improving it; and while the rapacious landlord would be punished, the public would suffer.

From the importance of capital to the farmer, it is evident, that where he unites prudence to energy, it would be of very great utility to enable him to procure the use of capital on as easy terms as the manufacturer or the merchant. He ought to gain from 10 to 15 per cent. on the capital he lays out. He can easily therefore pay 5 per cent. for the money he may have occasion to borrow. As the best means of enabling him to give adequate security, it has been suggested that the farmer shall have the power of sub-letting his farm, or assigning his lease, always securing a preference to the landlord on equal terms. A prudent farmer, of respectable character, would in that case never want credit when necessary; and his difficulties regarding capital would in a great measure be done away. If this system were encouraged by liberal proprietors, persons possessed of ardent minds, and a turn for agricultural improvement, with a power of sub-letting under reasonable restrictions, might go on improving one farm after another, and thus be the means of bringing extensive tracts of country, even in remote districts, into a productive state. But this plan cannot take place, where the tenant is not enabled to pledge the improvements on his farm as a security to his creditors.

LIQUID MANURE.—The farmers and gardeners of German Switzerland give the name of *gulle*, in French *lizier*, to the liquid manure obtained from their stalls and stables, and collected into underground pits or reservoirs, in which it is allowed to ferment in a mucous or slimy state. The manner of collecting it, adopted by the agriculturists of Zurich, is as follows: The floor on which the cattle are stalled is formed of boards, with an inclination of 4 inches from the head to the hinder part of the animal, whose excrements fall into a gutter behind, in the manner usual in English cow-houses. The depth of this gutter is 15 in., its width 10 in.; it should be so formed as to be capable of receiving at pleasure water to be supplied by a reservoir near it: it communi-

cates with five pits by holes, which are opened for the passage of the slime, or closed, as occasion requires. The pits, or reservoirs of manure, are covered over with a floor of boarding, placed a little below that on which the animals stand. This covering is important, as facilitating the fermentation. The pits, or reservoirs, are made in masonry, well cemented, and should be bottomed in clay, well beaten, in order to avoid infiltration. They should be five, in order that the liquid may not be disturbed during the fermentation, which lasts about four weeks. Their dimensions should be calculated according to the number of animals the stable holds, so that each may be filled in a week: but whether full or not, the pit must be closed at the week's end, in order to maintain the regularity of the system of emptying. The reservoirs are emptied by means of portable pumps. In the evening the keeper of the stables lets a proper quantity of water into the gutter; and on returning to the stable in the morning, he carefully mixes with the water the excrement that has fallen into it, breaking up the more compact parts, so as to form of the whole an equal and flowing liquid. On the perfect manner in which this process is performed, the quality of the manure mainly depends. The liquid ought neither to be thick, for then the fermentation would be difficult, nor too thin, for in that it would not contain sufficient nutritive matter. When the mixture is made, it is allowed to run off into the pit beneath, and the stable-keeper again lets water into the trench. During the day, whenever he comes into the stable, he sweeps whatever excrement may be found under the cattle into the trench, which may be emptied as often as the liquid it contains is found to be of a due thickness. The best proportion of the mixture is three-fourths of water to one-fourth of excrement, if the cattle be fed on corn: in a course of fattening, one-fifth of excrement to four-fifths of water will be sufficient.—[Bull. du Comite d'Agri. de la Soc. des Arts de Geneve.]

This mode of increasing the manure produced by stalled cattle and cows is in general use in Holland and the Netherlands, and we have seen it practised in France, at Trappe and Grignion, near Versailles; at Roville, near Nancy; at Ebersberg and Schleissheim, near Munich; and at Hohenheim and Weil, near Stuttgard. We would strongly recommend the practice to the British farmer, and not to the farmer only, but to every cottager who keeps a cow or pig; nay, to the cottager who is without these comforts, but who has a garden, in which he could turn the great accession of manure so acquired to due account. Let him sink five tubs or larger earthen vessels in the ground, and let the contents of the portable receiver of his water-closet, all the water used for washing in the house, soapsuds, slops, and fermentable offal of every description, during a week, be carried and poured into one of these tubs; and if not full on the Saturday night, let it be filled up with water of any kind, well stirred up, the lid replaced, and the whole left for a week. Begin on the Monday morning with another tub; and when, after five weeks, the whole five tubs are filled, empty the first at the roots of a growing crop, and refill; or use two larger tubs, and continue filling one for a month; then begin the other; and at the end of a month empty the first; and so on.[Balt. Farmer.]

Description of a Safety Stirrup.—(By Samuel Jackson, M. D., of Northumberland, Penn.)—The business of the practical physician is not merely to prevent or cure diseases, but also to obviate all the casualties to which we are liable in the journey of life; hence, though the present paper may not be quite medical, or pertain, very strictly considered, to the pages of your journal, yet in as much as it recommends a means of safety to your numerous readers, most of whom are country practitioners and riders on horseback, it will not, by them at least, be thought out of place. Were I to present them with an effectual preventive or cure of hydrophobia, how great would be their exultation; and yet what we are now recommending might have prevented more death and distress, in this neighborhood at least, than has ever resulted from rabies canina. Not one case of this disease has been known within a radius of fifty miles from this place, and probably not within a much greater distance, for the last half century, while, within this very vicinity, and within a very few years, the most distressing lacerations, and even death, have been the sad consequences of persons being dragged by the stirrup.

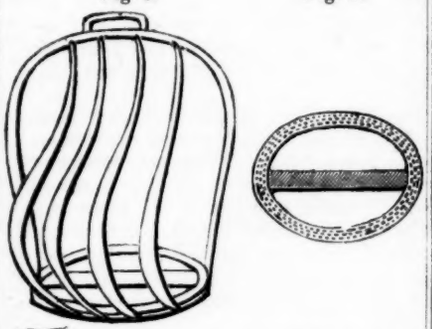
It is generally supposed that the spring stirrup, which opens at the side, affords safety in these cases, and there is an extract from one of my letters in the Medical Recorder, vol. xi., p. 203, in which it is highly recommended as securing the exit of the foot, let the rider fall in whatever way it is possible. But we have since learned from the actual experiment of falling and hanging by the stirrup, *in propria persona*, that our opinion, so confidently advanced, is utterly erroneous.

After using the stirrup for many years with the most comfortable assurances of safety, I was at last thrown, and my foot was held fast by it, while my head and shoulders rested on the ground. In this dreadful situation, my horse, though young and high-spirited, stood quiet by my side, while with infinite labor and pain I extricated my foot. I was then told that the rust of the hinge was the cause of its refusing to open, but this was a great error, as was proved by the following decisive experiment.

The hinge was well greased and made to work with very slight force: I then extended myself on the carpet with my foot in the stirrup, and giving the leather to my servant, I found it absolutely impossible to open it with my foot. The operations were varied in every way in which it was thought possible for a man to fall from his horse, and with the same result. The foot turns quickly round in falling, and hangs by the foot-piece of the stirrup.

I mentioned these things to my talented friend, Mr. Henry W. Snyder, of Selinsgrove, son of the late Governor of Pennsylvania, and he quickly made me a pattern of a stirrup, which I have since procured to be made by Mr. George Taber, of Philadelphia. It can be easily understood from the plate. Fig. 1, the entire stirrup. Fig. 2, the foot-piece.

Fig. 1. Fig. 2.



For an adult, three of the upright or safety irons are sufficient, but as the stirrup may be used by very young persons with small feet, they ought to be very close, and five would be required. These safety bars may be an inch broad. In order to afford him foot-hold, the foot-piece ought to be broad, and the opening in it guarded by a bar in the transverse diameter, as seen in the plate.

We cannot recommend this as a very handsome part of a horseman's caparison, but it is certainly not very unsightly; and until something better be invented, we beg leave to obtrude it upon the attention of all who would ride without fear of the deplorable consequences of being dragged by the common stirrup. Nearly all the evils attendant on human life are the immediate or remote consequences of neglecting either the moral or physical laws, by which our safety is ensured; and if any one reads this paper without availing himself of this cheap and easily procurable prophylactic, let us refer him for further instruction to one of the best books that ever saw the light—Combe "On the Constitution of Man." "We ought," says this author, "to trace the evil back to its cause, which will uniformly resolve itself into infringement of a natural or moral law; and then endeavor to discover whether this infringement could or could not have been prevented by a due exercise of the physical and mental powers bestowed by the Creator on man."—[American Journal of the Med. Sciences, Nov. 1833.]

White Rats.—Two of this variety of the rat species were caught a few days ago in Messrs. W. C. Barron & Co.'s bakery, in removing a kneading trough, under which they had burrowed. They were exhibited by the men who captured them in a large wire trap, and excited a great deal of curiosity; for among the hundreds who pressed to see them as they were carried through the street, there was probably not one who had seen their like before. They are very pretty pets; larger than the ordinary grey rat; have pink colored eyes, and long silky hair, like that of the Angora goat. They are apparently less timid than the grey rat. One of the latter was put into their cage, when both immediately set upon it and worried it to death.—[Norfolk Herald.]

Acorns are sometimes given to poultry, and would be valuable for fowls if they were dried and ground into meal. Acorns can be preserved in a state fit for vegetation for a whole year by involving them in bees-wax. Other seeds may be conveyed from distant countries by the same means. Miller advises to plant acorns as soon as they are ripe in October, and they will come up the following April. If they are attempted to be kept above ground through the winter, they are apt either to sprout or to lose the germinating principle.—[N. E. Farmer.]

To preserve Hams.—A writer in a southern paper states that he has for more than twenty years past kept meat hanging up in his smoke house through the summer season, and no fly, bug, or worm, has injured it.

To prevent such injury I take a strong ley made of wood ashes; I commonly boil it to make it stronger than it usually runs off; then I take my bacon and smoked beef, having two or three gallons of the ley in a large iron bottle, and take each piece of the meat and dip it into the ley, so that it is completely wetted with it, then I let it dry; then I hang the meat in its former place. By this process I have invariably found that it kept meat free from bugs and worms, and no taste of ley is ever perceived even on the outside.

Geese at Michaelmas.—The custom of eating geese at Michaelmas must have existed much longer than is generally supposed. It is said, we well know, that Queen Elizabeth was eating goose when news arrived of the destruction of the Spanish Armada, and that it has since been the custom to have a goose on the table on Michaelmas-day in commemoration of that important event: but there seems to be no real cause why that sort of poultry should be brought to our tables at Michaelmas, unless it be that geese at Michaelmas are better than at other times of the year. Our ancestors were in the habit of eating geese on Michaelmas-day as early as the fifteenth century, and that fact decides the story told of Elizabeth and the Spanish Armada. In Blount's *Ancient Tenures of Land and Jocular Customs of Manors*, there is an extract from the rolls, by which it appears that Johannes de la Hay, in the reign of Edward the Fourth, took from Will. Barneby Lord of Lastres, in the county of Hereford, a piece or parcel of land, paying for the same 22d. per annum, and a goose (*pro prandio Domini in Festio S. Michaeli Archangeli*) fit for the Lord's dinner on Michaelmas-day.

OBITUARY—*Thomas Say.*—Our friend, Mr. A. Walsh, who is ever watchful to catch something interesting for us, has sent us the following, from a newspaper source.

Died, at New Harmony, State of Indiana, on the 10th ultimo, THOMAS SAY, the distinguished Naturalist, in the 47th year of his age.

To a mind fully impressed with the glories of nature, to an ardent votary in the temple of fame, the allurements of pleasure and the desire of wealth are equally indifferent; his studious habits unfitted Mr. Say for mercantile pursuits, and he consequently failed in an occupation in which he eagerly engaged, at the solicitation of a kind parent, the late highly respected Dr. Say. The Moloch of riches was sacrificed at the shrine of science. He subsequently devoted himself with an enthusiasm which can never be too much admired, and a resolution which no reverse of fortune could shake, to the study of his favorite sciences: with what success the republic of letters can testify—ask the Savans of Germany, of France, and of England, and they will with one accord thankfully acknowledge the discoveries due to his labors. It may indeed be fearlessly asserted that few individuals, certainly none in this country, have so extensively contributed to enlarge the boundaries of natural knowledge. To *his* native genius, supported by untiring zeal and indefatigable research, the Academy of Natural Sciences of Philadelphia is indebted for its opening reputation. Mr. S. was among the earliest members, if not one of the founders of the institution.

His original communications to the Society alone, in the most abstruse and laborious departments of Zoology, Crustacea, Testacea, Insecta, &c., of the United States, occupy more than 800 printed pages of their journal. His essays published in the transactions of the American Philosophical Society, the Annals of the Lyceum of Natural History of New York, in Silliman's Journal, &c., are equally respectable, perhaps equally numerous. His contributions to the American Encyclopedia, though highly valuable, are not so generally known. His separate work on American Entomology and another on Conchology, have met with the approbation of the learned. With the brilliant results of his laborious exertions as Naturalist to the two celebrated expeditions by the authority of the United States Government, under command of Major, now Lieut. Col. S. H. Long, the reading public is already familiar. Some years previously he accompanied Mr. McClure, and other kindred spirits, on a scientific excursion to the Floridas. The pages of the Academy's Journal were subsequently enriched by the fruits of this undertaking. These expeditions, with occasional excursions, made with similar views, in the vicinity of Philadelphia, constitute the only interruption to a laborious course of studies, steadily and unostentatiously pursued, in his native city, in which many departments of natural science were successfully cultivated and extensively enriched by his observations and discoveries.

In the year 1825 our devoted student consented, in an evil hour, to forego the society of his early friends, the companions of his labors, and all the advantages of a large and populous city, and at the earnest instigation of his friend, Mr. McClure, President of the Academy of Natural Sciences, he abandoned forever his native home. New Harmony, on the Wabash, State of Indiana, had now become the Land of Promise, where new views of the social compact, and new institutions, literary and philosophical, were to be promulgated and tested. How soon these Eutopian visions vanished in airy nothings the public is well informed. The principal agents in this Agrarian establishment are scattered to the four corners of the earth, whilst man, as usual, is hurried along to the consummation of his destiny. Considerable sums had been expended in landed property; this required the presence of a few confidential agents to protect it; in this capacity Mr. Say consented to fix his permanent residence at New Harmony, at the request of Mr. Wm. M'Clure, whose infirm state of health obliged him to seek a more genial clime. Mr. S. soon after his arrival in New Harmony, wedded a lady of congenial habits, and appears to have become reconciled to his new domicile: mere locality was to a considerable degree matter of indifference to a naturalist, so long as he found himself surrounded in rich profusion with the objects of his research, supplied as he was, by the liberality of his patron, with a valuable library.

Our much lamented friend had recently devoted much of his time to the publication of his work on American Conchology, elucidated by expensive plates. He might have continued thus usefully employed for many years, had not the climate on the Wabash proved injurious to his health; he repeatedly suffered from attacks of fever and dysenteric affections, by which a constitution originally robust and inured to hardships materially suffered. A letter announcing the sad catastrophe which deprived society of one of its worthiest members and science one of its brightest ornaments, informs us that Mr. S. suffered another attack of a disorder similar to that by which his constitution had already been shattered, about the first of October: on the 8th the hopes of his friends were flattered by a deceitful calm; on the day following, these hopes were chilled; he appeared sinking under debility, when on the 10th death came over him like a summer cloud. He died intestate and without issue, but left with his wife verbal directions relative to the final dispositions of his library and Cabinet of Natural History. H.

RICE DELICACIES.—So little seems to be known about the various methods of cooking Rice, that we have concluded to present our readers with the following receipts. By the by, why is it that the mills do not prepare *Rice flour?*

To make Loaf Rice Bread.—Boil a pint of rice soft, and add a pint of leaven, then three quarters of the flour, put it to rise in a tin or earthen vessel, until it has risen sufficiently, divide it into three parts, then bake it as other bread, and you will have three large loaves.

To make Journey or Johnny Cake. — To three spoonfuls of soft boiled rice, add a small tea-cup of water or milk, then add six spoonfuls of the flour, which will make a large Journey Cake, or six waffles.

To make Rice Cakes.—Take a pint of soft boiled rice, a half pint of milk or water, to which add twelve spoonfuls of the flour—divide it into small cakes, and bake them in a brick oven.

To make Wafers.—Take a pint of warm water, a tea-spoonful of salt, add a pint of the flour, and it will give you two dozen wafers.

To make Rice Puffs.—To a pint of the flour add a tea-spoonful of salt, a pint of boiling water—beat up four eggs, stir them well together, put from two to three spoonfuls of fat in a pan, make it boiling hot, and drop a spoonful of the mixture into the fat, as you do in making common fritters.

Rice Flour Sponge Cake. — Make like other Sponge Cake, except that you use three quarters of a pound of rice flour, thirteen eggs, leaving out four whites, and add a little salt.

Rice Flour Blanc-Mange.—Boil one quart of milk, season it to your taste with sugar, rose or peach water. Take four table-spoons heaping full of rice flour, mix it very smooth with cold milk, add this to the other milk while boiling, stirring it well. Let all boil together about ten minutes, stirring occasionally, then pour it into moulds and put it by to cool. This is a very favorite article for invalids.

Rice Cake. — Mix ten ounces of ground rice, three ounces of flour, eight ounces of powdered sugar; then sift those articles by degrees into 8 yolks and 6 whites of eggs, and the grated peel of one lemon. Mix the whole well together in a tin stew-pan over a very slow fire with a whisk, then put it immediately into the oven in the same pan, and bake forty minutes.

Plain Rice Pudding. — Wash and pick some rice; throw among it some alspice finely powdered, but not much; tie the rice in a cloth, and leave plenty of room for it to swell. Boil it in a quantity of water for an hour or two; when done, eat it with butter and sugar, or milk. Put in a lemon peel if you choose.

Rice Pudding with Fruit.—Swell the rice with a very little milk over the fire, then mix fruit of any kind with it, currants, gooseberries scalded, pared and quartered apples, raisins or black currants, with one egg in the rice to bind it. Boil well, and serve with butter and sugar. If apples are used, it is better to enclose them in the rice, as with paste. This makes a very delicious pudding.

A Dutch Rice Pudding.—Soak four ounces of rice in warm water half an hour, drain the water from it, and throw it into a stew-pan, with half a pint of milk, a stick of cinnamon, and simmer it till tender. When cold, add four whole eggs well beaten, 2 oz. of butter, melted in a tea-cupful of cream, 3 oz. of sugar, a quarter of a nutmeg, and some lemon peel. Put a light puff paste into a mould or dish, and bake it in a quick oven.

A Rich Rice Pudding.—Boil half a pound of rice in water with a little salt, till quite tender, drain it dry. Mix it with the yolks and whites of four eggs, a quarter of a pint of cream with two ounces of butter melted into it, four ounces of beef suet or marrow, finely spread, three quarters of a pound of currants, two spoonsful of brandy, one of peach water or nutmeg and lemon peel; when well mixed, put a paste round the edge, and fill the dish; slices of candied orange, lemon, or citron, if approved. Bake it in a moderate oven.

Another.—Boil one pint of milk, mix two table spoonfuls of rice flour with a little cold milk, stir it in while the milk is boiling, afterwards add a small piece of butter, five eggs, one nutmeg, one glass of wine, the juice and peel of one lemon, and sugar to your taste.

Savory Rice.—Wash and pick some rice, stew it very gently in a small quantity of veal, or rich mutton broth, with an onion, a blade of mace, pepper and salt; when swelled, but not boiled to mash, dry it on the shallow end of a sieve before the fire, and either serve it dry, or put it in the middle of a dish, and pour the gravy round, having heated it.

Besides the above, it is a good food for children; and it may also be used for the thickening of soups, custards, pies, &c.

TO MAKE A PUDDING.—Take a quart of milk, add a pint of the flour, boil them to a pap, beat up six eggs, to which add six spoonfuls of Havana sugar and a spoonful of butter, which, when well beaten together, add them to the milk and flour—grease the pan it is to be made in, grate nutmeg over the mixture, and bake it.

PRESERVING CHEESE FROM WORMS AND MITES.—Grains of whole pepper put into a vessel in which cheese is kept, it is said will preserve it against these insects. Probably pods of the common red pepper, (capsicum,) would answer the same purpose.

RIDDANCE OF RATS.—Near Edinburgh, a farmer, who was troubled with rats, caught 400, by placing a copper kettle in his corn-loft, filling it about half full of water, and strewing a thin sprinkling of chaff over it. By a few boards, extending from the wall to the kettle, the rats would jump among what they took to be a fine lot of grain, and were drowned.

APPENDIX

TO THE

NEW-YORK FARMER, AND AMERICAN GARDENER'S MAGAZINE.

Braddock's Defeat, and Washington's Early Fame. By H., a Correspondent of the New-York American.

NOVEMBER 10th.

It was a bright bracing autumnal morning as I rode out of Pittsburg, with a party of gentlemen for "Braddock's field." Our route followed the course of the river; sometimes keeping the rich bottom on its borders, and again ascending a hilly ridge which always commanded some varied view of that stream, conducted here by steep hills, whose shadows met as they slept upon its quiet bosom, and expanding there into a small lake, apparently so completely landlocked that it seems not a part of the bright current you can see flashing through through those meadows further on. After catching more than one glimpse like this of the landscape behind us whose sunny fields contrasted beautifully with the dense smoke of Pittsburg in the back ground, we struck into a ravine cutting the road hitherto pursued at right angles. Winding now thro' a deep dingle where the pathside was festooned with vines, we crossed a small brook and reached the shore of the Monongahela opposite to a broad alluvial flat, whose high cultivation and sunny aspect contrasted vividly with the wild and secluded dell from the mouth of which we beheld it. The road next led for of some distance through a wood on the immediate bank of the river, and then gaining the more public highway, we found ourselves, after passing several comfortable farm houses, immediately in front of the battle ground.

It is cut up now by three or four enclosures, —the field upon which the fight was hottest lying nearly in the centre, bounded on one side by the road, and having its opposite extremity about a quarter of a mile from the river, with a wooded flat intervening. Beyond this flat is the ford over which Braddock passed. The ground about three hundred yards from the ford rises in a gradual slope for some two hundred yards more, and then swells suddenly into a tolerably steep hill, the summit of which may be half a mile from the river. On the middle slope lies the central field of action, to which I have already alluded. It is seamed with two shallow ravines, which run parallel with each other towards the river, and are about gunshot apart.

In these ravines, concealed by the underwood, and protected by the trunks of trees felled for the purpose, lay the French and Indian force. It amounted, according to the best accounts, to only 500 men, and was commanded by a subaltern officer, who suggested this ambuscade as a desperate expedient to save Fort Du Quesne, from the overwhelming force that was about to invest it. The road of Braddock lay immediately between these enfilading parties.

It was about midday when he passed his troops over the river in detachments of two hundred and five hundred, followed by the column of artillery, the baggage, and the main body of the army commanded by himself in person. The latter had hardly time to form upon the flat below, when a quick fire in front told them that the two detachments which had gained the first slope were already engaged. Their comrades advanced in double quick step to sustain them; but the whole five hundred gave way, and falling back upon the advancing troops, struck panic and dismay throughout the ranks in a moment. The confusion seemed for a while irremediable. Some fired off their ammunition without aim or object, and others deaf to the commands and exhortations of their officers, flung away their arms and gave themselves up at once to despair.

Burning with the disgrace, and eager to shame their soldiers into better conduct, the British officers advanced singly and in squads among the bullets of the enemy. They were slaughtered indeed like sheep, but their men, whose retreat had been partially cut off by the river, rallied at the galling sight, and, after the cool determination of young Washington, who had already had two horses shot under him, and his clothes pierced with bullets, had imparted some steadiness to their feelings, they seemed ready to protract the fight to the best advantage. The madness of Braddock, however, whose weak mind took fire at the idea of receiving a lesson from a provincial youth of three and twenty, destroyed every remaining chance of success. He insisted upon his men forming on the spot, and advancing in regular platoon against an enemy which none of them could see. Line after line, they would hardly attain a pace between the fatal ravines before they would be mowed down like grass. But their courage was now up, and, though broken and in some disorder, they attempted, with courageous pertinacity, to secure each step they gained by protecting themselves behind the trees, and returning the murderous fire of the foe after his own fashion. The military coxcomb who commanded this ill-fated band would not hear of this. He stamped, raved, and swore, called his men cowards, and struck them with his sword. In the meantime, an evolution was being executed, n another part of the field, which might yet have turned the fate of the day. Capt. Waggoner, of the Virginia forces, pushed his fine corps, consisting of 80 men, beyond the voice of his besotted commander, to the summit of the hill, with the loss of only three men, in running the fearful gauntlet he did to attain that position. A fallen tree here protected his brave little force, and enabled him to rake the ravines which lay at right angles to his natural breastwork to great advantage. But the Virginians were mistaken by their English friends below for a new enemy, and fired upon so furiously that they were compelled to retreat from their position with the loss of two-thirds of the corps killed by their misguided comrades. Thus was the strife protracted for nearly three hours, when the fall of Braddock, after losing 700 men and 40 officers, put an end to the blind conflict. Fifteen hundred men, being thrice the number of the foe engaged, escaped to tell the havoc of the day, and spread consternation and horror throughout the provice.

The military chest of the British, containing 25,000 pounds, fell into the hands of the enemy, as did likewise an extensive train of artillery, with ammunition and provisions to a large amount. Among those who perished on this disastrous occasion, were Sir William Shirley, a son of the Governor of New York, and Sir Peter Halket, with one of his sons, and other officers of distinction or promise. Sir John St. Clair and Lieut. Colonel Gage, afterwards well known in our revolutionary history, were among the wounded. Many of the officers fell at the first onset, but Braddock himself had advanced some distance up the hill when he received the mortal wound of which he died a day or two afterward. The stump of the tree against which he leaned after being struck, is still pointed out in a wheat field above the highway. He was carried off, as you recollect, by the flying troops, and dying with many others on the march was buried beneath the road over which his men were retreating.

The letters of Horace Walpole, recently published, have thrown a light upon Braddock's character that should put an end at once to all the forbearance that has hitherto been exercised in commenting upon his share in this bloody transaction. The misfortunes of the hot and misguided, but high-bred and gallant soldier, were to be touched upon with lenity. The selfish rashness and utter destitution of military capacity of the broken down gambler should be stigmatized as they deserve. Yet it is not from Walpole alone that we learn what a presumptuous blockhead England sent hither to mend his ruined fortunes, at the risque of the best blood in the country. For, though history has dealt so leniently with his character, the records of those times paint the man in his true colors, and so gross was his ignorance, and so offensive his pride, that he seems to have been hated and despised from the moment he assumed the command of the forces destined hither. The interest with which I viewed the battle-ground, has kept me all the morning looking over a mass of documents relating to those times, and, as they are still before me, I am tempted to make more than one extract. "We have a general," writes the brave and accomplished Sir William Shirley, from the camp at Cumberland, to his friend, Governor Morris, at Philadelphia, "we have a general most judiciously chosen for being disqualified for the service he is employed in, in almost every respect. I am greatly disgusted at seeing an expedition, (as it is called,) so ill concerted originally in England, so ill appointed, and so improperly conducted since in America. I shall be very happy to have to retract hereafter what I have said, and submit to be censured as moody and apprehensive. I hope, my dear Morris, to spend a tolerable winter with you at Philadelphia." Poor Shirley, he never saw that winter. He was shot through the brain at the very commencement of the battle.

There is a lively comment on this letter in the well known reply of Braddock to the prudent suggestions of Washington previous to the battle:—"By G—d, Sir, these are high times, when a British General is to take counsel from a Virginia buckskin."

But the speech of an Indian Chief before the council of Pennsylvania, preserved among the records of Harrisburgh, offers an illustration still more striking. "Brothers," said the sagacious ally of the colonists, "it is well known to you how unhappily we have been defeated by the French on Monongohela. We must let you know that it was of the pride and ignorance of that great General that came from England. He is now dead; but he was a bad man when he was alive. He looked upon us as dogs, and would never hear anything that was said to him. We often endeavored to advise him, and to tell him of the danger he was in with his soldiers. But he never appeared pleased with us, and that was the reason that a great many of our warriors left him, and

would not be under his command. Brothers, we advise you not to give up the point, though we have in a measure been chastised from above. But let us unite our strength. You are very numerous, and all the Governors along your eastern shores can raise men enough.—Don't let those that come over the great seas be concerned any more. They are unfit to fight in the woods. Let us go by ourselves—*we that come out of this ground.* We may be assured to conquer the French." The military counsel and support of this intrepid and high-souled Chieftain would have been heard at least, even if it did not prevail, in the camp of Napoleon. Does it not make you indignant to think how it was trampled upon and insulted by such a creature as Braddock? One would have thought that the insolent spirit of the London debauchee would have felt rebuked into nothingness before the genius of the warrior of the woods. But let the man rest; he had that one virtue to which all weak minds bow—courage. And he had the Hessians, that in a subsequent war were bought to fight against us for eighteen pence a day. May we rather meet, again and again, such brave mercenaries in battle, than be marshalled once to the fight by a leader, whom even valor cannot shelter from deserved contempt.

The field of this celebrated action presents of course a very different appearance from what it did when Braddock's followers were here hunted through the forest. It is however but a few years since the wood was cut from the side-hill, and traces of the conflict are still occasionally discovered in the grove along the margin of the river below. I was told too that bones and bullets, with rusted knives, hatchets and bayonets, were sometimes even yet turned up by the plough in the spot where the fight was hottest. This central field was cleared about 17 years since. It was heavily timbered at the time, and they tell in the neighborhood that the teeth of the saws in the mills adjacent were continually broken upon the balls imbedded in the ancient trees. Incredible quantities of human bones and rust-eaten weapons are said to have been found beneath the surface of the soil, when the plough first invaded this memorable wood. I picked up a bone myself, which my horse's hoof disengaged from the soil, but my skill in anatomy not being sufficient to determine whether it was even human or not, I returned the mouldering relic to the dust, of which it was rapidly becoming a part. It was an animated and interesting hour's amusement, after our party had taken down the intermediate fences, which were too high to clear, to gallop over the whole battle-ground, and survey it from every point. A prettier spot to fight on never greeted the eye of a soldier. The undulations of the field are just sufficient to exercise a nice military discrimination in the choice of position, while the ground is yet so little broken that cavalry might act on any part of it to advantage. The centre of the battle-field would command a fine view of the river, were but a vista or two cut in the wood below; and even now it offers a beautiful scite for a private residence, and would, with the lands adjacent, make a noble park. There are a few superb oaks still standing at the foot of the slope, which might constitute a lawn, and—what must enhance the value of the place with all faithful ghost-believers and pious lovers of the marvellous—the dim form of the red savage, with a ghastly spectre of his pallid victim shrieking before it, it is said may be seen gliding at times among these hoary trunks. The exorcising light of noon most perversely shone down among them while I lingered near the spot, but I could fancy that the November wind which sighed among their branches was charged at times with a wailing sound, such—such in fact as an orthodox tree in a perfect state of health would never make of its own accord.

Returning home, one of the party proposed stopping at a gentleman's house in the vicinity, where a number of articles picked up from the field were said to be collected. Not a soul of us knew the proprietor of the establishment, and it would have amused you to see the effect produced upon its inmates, whom I soon ascertained to be a large collection of boarding school young ladies, by our formidable descent upon the premises. We were asked into a handsome parlor, and in about fifteen minutes our host appeared. A gentleman of our number, whose western frankness of manner and ease of expression made him the most suitable spokesman at such an awkward meeting, opened the preliminaries, and apologizing for our unceremonious intrusion revealed our character as relic hunters. The stranger host, overlooking the absence of "sandal shoon and scallop shell," welcomed us at once, with the same politeness that pilgrims have ever received in civilized countries, and regretting that he had not even enough of the "true cross" to swear by—not an atom of a relic—sent us home to our supper with appetites considerably sharpened by the disappointment.

Returning, I diverged with one of the company from the direct road a little, to take a look at the United States arsenal. It lies on the banks of the Alleganv, and consists, together with the officer's quarters, of a number of handsome brick buildings painted cream color, and so arranged with regard to each other, as that in connexion with the improved grounds adjacent, they make quite an imposing appearance.

It was nearly dark when we got fairly into town, where the dust and smoke along the streets, with the rattling of drays returning from their day's work to the suburbs, reminded me not a little of my own bustling city at night-fall. There is one sound, however, in the streets of Pittsburg, which utterly forbids a stranger mistaking them for those of any other town on the continent. It is the ceaseless din of the steam engines. Every mechanic here of any pretension has one of these tremendous journeymen at work in his establishment. They may be purchased for what would be the price of a pair of horses in New-York, and it costs a mere song to keep them in fuel. These machines must do the work of a great many thousand men at Pittsburg; and though I am hardly such a friend of universal suffrage as to think that these substitutes for men ought to be represented in the legislature, yet, upon my word, they should always be taken into consideration when estimating the population of the place, which their industrious labor renders so flourishing.

"Proud deeds these *iron men* have done."

SINGULARITY OF RECORDS.—There is, perhaps, no one principle in human nature that leads to greater consequences, than the concentration of application to singular research.

But this, like every other principle, has occasionally strange and useless terminations, that may be called *lusus naturæ* in mortals. As an instance of this, I will present you with the result of a man's labor for three years, eight or nine hours in a day, Sundays not excepted, to determine the verses, words, and letters, contained in the Bible.

Verses - - - -	31,173
Words - - - -	773,692
Letters - - - -	3,566,480

The middle and the least chapter is the 117th Psalm.

The middle verse is the 8th verse of the 171st Psalm.

Jehovah is named 6,855 times. The middle of these Jehovahs is in second Chronicles, fourth chapter and 16th verse.

The word *and* is found in the Bible 46,227 times.

The least verse in the Old Testament, is in first Chronicles, 1st and 10th verses. The least in the New Testament, 11th chapter of John, 35th verse.—[London paper.]

MILL-WORK.—Under this head we purpose noticing the simplest combinations of wheel-work which are employed in the construction of mills, and, under the articles WIND and WATER MILLS, complete views, both graphic and descriptive, will be given of their construction.

The business of a millwright is usually combined with the practical part of engineering, and much of the wind and water power formerly employed in giving motion to machinery is now superseded by the introduction of the steam engine. Indeed, without the agency of steam power, this country could in no shape compete with other manufacturing nations; so that, on account of the great importance of the steam engine as a prime mover, it will be advisable to devote a commensurate space to its illustration.

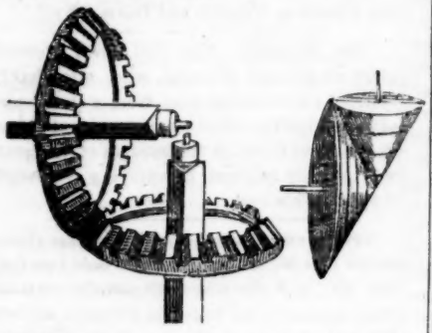
Various are the methods by which motion may be communicated from one part of a machine to another; and much of the skill of the millwright consists in his adapting certain methods to his particular purposes. Sometimes a simple cord, or a cord with pulleys, may be used. Levers, either simple or combined, are employed to communicate and also change the direction of the motion. Rods also are employed, which may be carried to a great distance by being connected together. But of all the modes of communicating motion, that by means of wheels is the most frequent. Wheels may be made to turn each other even by the simple contact of their surfaces when pressed together; or their circumferences may be formed into brushes with short thick hair, which enable them to turn each other with considerable force; or they may have cords, or straps of leather, or chains, passing from one to another; and at other times there are points or protuberances on the rims of the wheels. The most usual method, however, of making wheels drive each other, is by means of teeth. These are either cut into the substance of which the wheel is composed, when it is of metal; or formed at the same time as the rest of the wheel, when it is cast.

The proper method of shaping the teeth of wheels, so as to communicate the motion equally, and with as little friction as possible, is a matter of very great nicety, and has given rise to much study among mechanics. The ends of the teeth should be curves, but not parts of complete circles. They may be formed of the curve called the epicycloid, or of the involutes of circles, which are curves described by a point of a thread, which has been wound round the wheel while it is uncoiled.

A wheel which has teeth cut upon the circumferences, so as to project out in the plane of its face, is called a spur wheel; and, when the projection of the teeth is at right angles to the face of the wheel, and parallel to the axis, the wheel is called a crown or contrate wheel. Sometimes the faces of the two wheels are in the same plane, and consequently the axes parallel; and at other times the axes are at right angles to each other, one being a spur and the other a contrate wheel.

There is a mode of placing the teeth frequently resorted to, which consists in levelling the edge of the wheel, and cutting the teeth on the bevel, by which they may turn in

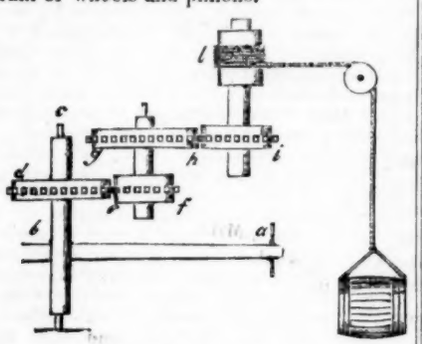
each other, though variously inclined, and the teeth have also great strength. The principle consists in the cones rolling on the surface of each other, as in the annexed right-hand engraving; if their bases are equal, they will perform their revolutions in one and the same time.



If the cones are fluted, or have teeth cut in them diverging from the centre, they are then called *bevel geer*. The teeth may be made of any dimension, according to the strength required; and it is of great use to communicate a motion in any direction, or to any part of a building. The bevel geer represented in the left-hand figure must be supported by a frame at the point where the pivots intersect each other. The frame is usually formed of iron or wood, and when the latter is employed the pivot-hole is of brass. The perpendicular shaft should always be made to revolve on a sharp point in the centre.

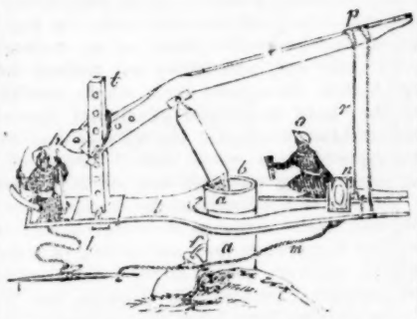
Hook's universal joint, (described at page 154, vol. ii,) may be applied to communicate motion instead of bevel geer, where the speed is to be continued the same, and where the angle does not exceed thirty or forty degrees and the equality of motion is not regarded; for, as it recedes from a right line, its motion becomes very irregular. This joint may be constructed by a cross, or with four pins fastened at right angles upon the circumference of a hoop, or solid ball. It is of great use in cotton mills, where the tumbling shafts are continued to a distance from the moving power.

The employment of animal power in the simplest species of mill-work may be well illustrated by the accompanying sketch, in which a horse may be attached to a long lever, and thus made to raise a weight by a train of wheels and pinions.



The weight to be raised is suspended by a rope or chain which winds round the drum, *l*. On the same axis is placed a wheel, *i*. actuated by another wheel, *g h*. The wheel, *d e*, gives motion to the whole, by the intervention of the small wheel at *f*. A horse at *a* may be considered as the prime mover, as the lever *a b* is on the axis *c*. Now, in this apparatus, there is a loss of power, but a gain in velocity.

The various modes of constructing mills for domestic, as well as manufacturing processes, will be explained hereafter, and we now purpose confining ourselves to a single example of the mode of employing animal power, in a way which, from its simplicity, might be adopted to a great extent in this country. There is a mill of a cheap and effective kind used in many parts of the East, which appears to have suggested the use of the ordinary snuff-mill. Indeed, it is, in some respects, superior to it. This mill, which is employed in the preparation of sugar, consists of a mortar, beam, lever, pestle, and regulator, as represented in the engraving beneath:



The mortar, *a a*, is a tree about ten feet long and fourteen inches over, which is sunk in the earth, so as to leave about two feet above ground. At the top is formed a conical cavity like a funnel, which ends in a hollow cylinder, with a hemispherical projection at the bottom, in order to allow the juice to run freely to the small opening that conveys it to a spout, *f*, from which it runs into an earthen pot. Round the upper mouth of the mortar is a circular cavity, *b*, which serves to collect any of the juice that may run over from the upper end of the pieces of cane. A channel is cut to convey this juice down the outside of the mortar to the spout, *f*.

The beam, *i*, is about 16 feet long and 6 inches thick, and is cut from any large tree that is divided by a fork into two arms. A hollow circle is made in the fork for the mortar, round which the beam turns horizontally: the surface of this excavation is secured by a semi-circle of some strong wood; the other end of the fork is left quite open, in order that the beam may be changed without any trouble. The bullock driver sits on the undivided end, to which the cattle are yoked by a rope, *l*, from his end of the beam, and they are kept in the circular tread by another rope, *m*, which passes from the yoke to the forked end of the beam. A basket, *n*, is placed upon the forks to hold the cuttings of the cane, and the man, *o*, who feeds the mill, sits between this basket and the mortar. He takes care to place the pieces of cane sloping down the cavity of the mortar, just at the time that the pestle comes round; and after the pestle has passed, he removes those which have been squeezed.

The lever, *p*, is a piece of timber nearly as long as the beam. The thickest end, which is also the lowest, is connected with the undivided end of the beam by means of a regulator, *t*. A little way from the place where it is joined to the regulator, a piece of very hard wood is morticed into the lower side of the lever, and a smooth conical hollow is made in this piece, to receive the head of the pestle. The end of the lever furthest from the regulator is fastened by two ropes to the two arms of the beam.

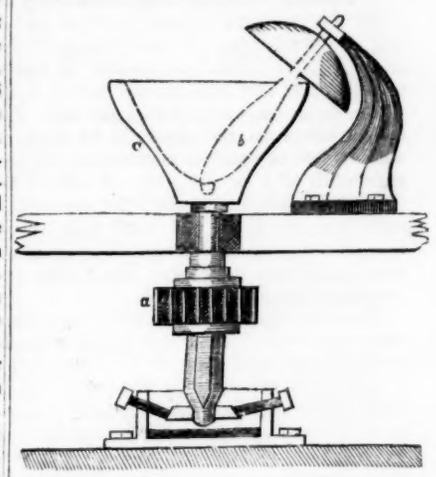
The pestle is a strong cylindrical piece of timber, cut to a point at each end. The upper end is a smooth cone, the lower end a pyramid of 12 to 15 sides, at the point of which is a strong cylinder. As the pestle is placed obliquely, it rubs strongly against the sides of the mortar as it passes round; and its cylindrical point rubs also on the top of the hemispherical projection, *d*, which is in the bottom of the cavity of the mortar.

The regulator, *t*, is a strong square of timber, which passes through the undivided end of the beam, and is secured below it by part of its circumference being left for cheeks. It is pierced by eight holes, and a pin is placed in the lowest hole, to prevent the regulator from falling when the strain is removed.

The canes with which the mill is supplied are cut into pieces six inches long. The mill goes night and day during crop time, and presses about fifty-six pots, or 218 gallons of juice, in that time. Two bullocks are used at a time, and as they are driven very fast, they are changed every time three pots of juice are expressed, and work no more that day.

In the manufacture of snuff in this country, the grinding is performed by a loaded pestle, made to turn round as it rubs against the sides of a cast iron mortar, the pointed lower end of the pestle being retained in its place by a hole at the bottom of the mortar. In large manufactories, a number of these mortars are placed in a circle, having a large toothed wheel in the centre, surrounded by as many upright spindles, with pinions to work in the wheel.

Mr. Gill has proposed an improvement on this plan, which is represented beneath:



The mortar, *c*, is in this arrangement made to revolve, and the pestle, *b*, is supported by a bracket firmly attached to the beam beneath. The pinion, *a*, rests on a conical axis, and communicates, as in the old arrangement, with the principal driving wheel.

Water-mills are of three kinds: *Breast-mills*, *undershot-mills*, and *overshot-mills*, according to the manner in which the water is applied to the great wheel. In the first, the water falls down upon the wheel at right angles to the *float-boards*, or bucket, placed to receive it. In the second, which is used

where there is no fall of water, the stream strikes the float-boards at the lower part of the wheel. In the third, the water is poured over the top, and is received in buckets arranged round the wheel.

A less quantity of water will turn an overshot mill (in which the wheel has buckets instead of float-boards) than a breast-mill, where the fall of water seldom exceeds half the height of the wheel; so that, when there is but a small quantity of water, and a fall great enough for the wheel to lie under it, the bucket, or overshot-wheel, is always used; but, where there is a large body of water, with a small fall, the breast or float-board must be used. Where the water runs only upon a small declivity, it can act but slowly upon the under part of the wheel, in which case the motion of the wheel will be slow; and therefore the floats ought to be very long, that a large surface of water may act upon them, so that what is wanting in velocity may be made up in power; and then the cog-wheel may have a greater number of cogs in proportion to the rounds in the trundle, in order to give the mill-stone a sufficient degree of velocity.

It was the opinion of Smeaton, that the powers necessary to produce the same effect on an undershot-wheel, a breast-wheel, and an overshot-wheel, must be to each other as the numbers 2·4, 1·75, and 1.

Wind, which we may consider as the next substitute for animal power, appears to have been first employed to give motion to machinery in the beginning of the 6th century. The use of this species of mechanical force is, however, principally limited to the grinding of corn, the pressing of seed, and other simple manipulations, the great irregularity of this element precluding its application to those processes which require a continued motion.

A windmill with four sails, measuring seventy feet from the extremity of one sail to that of the opposite one, each being six feet and a half in width, is capable of raising 926 lbs. 232 feet in a minute, and of working on an average eight hours per day. This is equivalent to the work of 34 men, 25 square feet of canvass performing the average work of a day laborer. A mill of this magnitude seldom requires the attention of more than two men; and it will thus be seen that, making allowance for its irregularity, wind possesses a decided superiority over every species of animal labor.

The following very important errors have frequently been made by mathematicians and practical mechanics, in the estimation of the force of the wind or the water on oblique surfaces; they have generally arisen from inattention to the distinction between pressure and mechanical power. It may be demonstrated that the greatest possible pressure of the wind or water, on a given oblique surface at rest, tending to turn it in a direction perpendicular to that of the wind, is obtained when the surface forms an angle of about 55° with the wind; but that the mechanical power of such a pressure, which is to be estimated from a combination of its intensity with the velocity of the surface, may be increased without limit by increasing the angle of inclination, and consequently the velocity. The utmost effect that could be thus obtained would be equal to that of the same wind or stream acting on the float-boards of an undershot-wheel; but, since in all practical cases the velocity is limited, the effect will be somewhat smaller than this: for example, if the mere velocity of the sails or float-boards be supposed equal to that of the wind, the mechanical power will be more than four-fifths as great as that of an undershot wheel; that is, in the case of a windmill, more than four-fifths of the utmost effect that can be obtained from the wind. In such a case Maclaurin has shown that the sails ought to make an angle of 74° with the direction of the wind: but in practice it is found most advantageous to make the angle somewhat greater than this, the velocity of the extremities of the sails being usually, according to Mr. Smeaton, more than twice as great as that of the wind. It appears, therefore, that the oblique sails of the common windmill are in their nature almost as well calculated to make the best use of any hydraulic force as an undershot-wheel; and, since they act without intermission throughout their whole revolution, they have a decided advantage over such machines as require the sails or fans to be exposed to a more limited stream of the wind during one half only of their motion, which is necessary in the horizontal windmill, where a screen is employed for covering them while they are moving in a direction contrary to that of the wind: and such machines, according to Smeaton, are found to perform little more than one-tenth of the work of those which are more usually employed. The sails of a common windmill are frequently made to change their situation, according to the direction of the wind, by means of a small wheel with sails of the same kind, which turns round whenever the wind strikes on either side of it, and drives a pinion turning the whole machinery; the sails are sometimes made to furl or unfurl themselves, according to the velocity of the wind, by means of a revolving pendulum, which rises to a greater or less height, in order to prevent the injury which the flour would suffer from too great a rapidity in the motion, or any other accidents which might happen in a mill of a different nature. The inclination of the axis of a windmill to the horizon is principally intended to allow room for the action of the wind at the lower part, where it would be weakened if the sails came too nearly in contact with the building, as they must do if they were perfectly upright. When it is necessary to stop the motion of a windmill, a break is applied to the surface of a large wheel, so that its friction operates with a considerable mechanical advantage.—[Partington's Scientific Gazette.]

WHEAT FROM PLACES ON THE CANAL.—The Brockport Chronicle furnishes the following number of bushels of wheat, shipped from the several places on the canal between that village and Lockport. Most of the wheat was probably shipped to this city. We hope similar local statements will soon be made by every newspaper in the state.

Gosport,	10,410
Middleport,	23,225
Medina,	11,305
Knowlesville,	36,833
Eagle Harbor,	10,430
Gaines Basin,	9,927
Albion,	74,581
Hinds,	7,050
Scio,	3,360
Holley,	95,779
Brockport,	222,743
Total,	564,642

COMMITTEES ON AGRICULTURE IN CONGRESS: *Senate*—Messrs. Brown, Robinson, Kent, Swift, and Wright.

House of Representatives—Messrs. Bockee, Taylor, (Va.) Hathaway, Bornitz, Bean, Dunlap, Clowney, Turner, and Davis, (Ky.)

THE MAGNET.—The Fall River Recorder gives an account of a man, who, after having suffered excruciating pain, from a sharp piece of iron in his eye, until he was so much injured in health as to be on the borders of the grave, was happily relieved by applying a powerful magnet to his eye.

APPLES FOR HOGS.—The Hampshire Gazette states that Mr. Ebenezer Hunt sold two hogs, one 380, and the other 343 pounds—that they were common lean hogs last summer, and were fattened almost wholly on sweet apples, most of which were boiled. They each consumed, in addition to the apples, not over two bushels of corn and twelve bushels of potatoes.

The two, 723 lbs. at 5 cents,		$36 15
24 bushels potatoes, 20 cents,	$4 80	
4 " corn, 60 "	2 40	
		7 20
		$28 95

The manure and entrails may be supposed to pay for the apples and fuel, leaving $28 95 mostly as clear gain.

SALT A MANURE FOR COTTON.—Alexander Jones, M. D., recommends, in the American Farmer, the use of salt as a manure to improve the staple of cotton. He says, if sea island cotton be planted for several years in succession in the interior of the country, it degenerates into the short staple cotton. In support of the benefit from salt, it is said that cotton in the vicinity of salt springs and licks is of a larger staple.

MIXING OF FLOWER AND SUGAR, MILK AND BUTTER, &c.—The following is taken from the Southern Planter, and, as the writer says, involves much science in connection with the explanation:

Mr. Editor: A gentleman came to my house to spend a night with me. I put a spoon full of wheat flour and a spoon-full of inferior brown sugar in my marble mortar and stirred them well together, and next morning desired his opinion what it was; he examined it and pronounced it sugar of a superior quality. When informed that it was half flour, he could scarcely believe it, but wanted to know if a better judge would be deceived in the same way: another spoon-full of each was prepared in the same way, and carried twenty odd miles to a man whom he supposed would be a very good judge. I knew myself that he was raised a merchant and accustomed to deal in the article: he also pronounced it very superior sugar. Such is the fact, that one spoon-full of flour and one of sugar, thus prepared, will taste and look exactly like sugar; and that if the sugar was rather dark colored, it will improve the looks; not only so, it will sweeten as much coffee as two spoons-full of sugar; in fact, it will be two spoons-full of sugar.

If one cup have the sugar put in it first, then the coffee and then the milk, and in another cup one-third less sugar be put, then the milk, and then be well rubbed together with a little pestle, and then the coffee be added, the last will be found as sweet as the first, although it has one-third less sugar. If the sugar is put in first, then the milk, and then be well stirred with a spoon before the coffee is added, it will require a third less sugar, and the taste will be

much superior to coffee made by adding the milk after the coffee is poured on the sugar.

If a pint of fresh rich milk is made blood warm, and a pint of butter be put in it, and then be stirred well until cold, a quart of butter will be made, that will look as well and butter as many biscuits as a quart of butter. This butter thus prepared has one defect—it will not keep: but it has one quality that should balance this defect: when our butter is quite salt, by preparing it in this way, it is one half less salt, and much more palateable.

When butter is to be made, if a little old butter be put in the cream, the butter will come from much less churning. When soap is to be made, if a little old soap be put in the ley and grease, the soap will be made by considerably less boiling.

The conversion of molasses and water is made quickly into beer by adding a little old beer to it. A little yeast being added to flour makes it all ferment, and if a little of this fermented mass be added to more flour, it makes it ferment also, and then a little yeast by proper management would in time convert all the flour of the earth into its own nature.

Indian Meal Bread.—Take as much corn meal as is wanting for use, sift it through a hair sifter, put it in an iron pot, and pour on it boiling water; stir it with a spatula or ladle till it becomes well mixed and quite thin; this being night, let it remain in the same vessel till morning, and if kept warm it will be well fermented, (which is necessary.) Then put it in what is called a Dutch oven, it being hot before the dough is put in it; apply good live coals on the lid of the oven and under it, being careful not to burn the bread. When thus prepared, if done carefully and according to this recipe, more wholesome and better bread cannot be used for breakfast. I think it an antidyspeptic, as no lard or butter is used in preparing the bread, though after it is cooked, good fresh butter adds to its flavor.—[American Farmer.]

Recipe for making Red Pickle Cabbage.—Take as many hard heads of cabbage as are wanting; slice them thin, spread a clean cloth on a board, and place a layer of cabbage thus cut, and a sprinkle of fine salt, and so on till all is put on the board: again put a napkin over it, then another board and a few hundred pounds weight on the board; let it remain two or three days in this manner; take a parcel of pokeberries and squeeze the juice out of them; boil the juice together with some strong cider vinegar, adding during the process of boiling a little unground allspice. The cabbage may be put in stone pots, in layers, and the vinegar poured on it. It is then fit for use, and a superior pickle it is, both as to flavor and color, being a deep red. Time of making is between the middle of October and middle of November, or before the pokeberries are gone.—[American Farmer.]

Care of Horses.—An old English writer says that the groom, or man who has care of horses, should demean himself in so kind and gentle a manner towards horses, as to engage them to love him; for a horse is reckoned one of the most loving creatures to man of all brutes, and in every respect the most obedient.

Therefore, if he be dealt with mildly and gently, his kindness will be reciprocal; but if the groom or keeper be harsh and choleric, he will put the horse out of patience, and make him become rebellious, and occasion his biting and striking.

Therefore the groom should frequently dally, toy, and play with the horses under his care, talk to them, and giving them good words, leading them out into the sunshine, there run and show them all the diversion he can.

He must also duly currycomb and dress him, wipe away the dust, pick and clean him, feed and cherish him, and constantly employ himself in doing something about him, as looking to his heels, taking up his feet, rubbing upon the soles.

Nay, he ought to keep him so well dressed that he can almost see his own face upon his coat; he must likewise keep his feet stopped and anointed daily, his heels free from scratches, and other defects, ever having a watchful eye over him, and overlooking all his actions, as well feeding as drinking; that so no inward infirmity seize upon him without his being able to discover, and endeavoring to cure his complaint.

The next thing requisite to a groom is neatness, as to keeping the stable clean swept and in order; saddles, housing cloths, stirrups, leathers, and girths, clean, and above all, his horses clean dressed and well rubbed.

Lastly, diligence is requisite in a daily discharge of his duty, observing any and the smallest operation, whether casual or accidental, either in his countenance, as symptoms of sickness, or in his limbs and gait, as lameness, or in his appetite, as forsaking his meat; and immediately on any such discovery, to seek out a remedy.

Disease in Horses—Big Head.—A writer in the American Farmer gives a process of cure for the big head, a disease not uncommon in his section of the country—North Carolina.

From my first notice of the disease, and from some *post mortem* observations, I am led to the opinion that it is a morbid growth, of the spongy or honeycomb bone, that occupies in the upper jaw all that space from the eye to the nostril not occupied by the soft parts—and just under a thin lamina, or layer of firm bone, that covers the whole exterior of the head. The first symptoms of the disease are sluggishness, downcast and weeping eye, declined appetite; after exercise, he places one fore foot in advance of the other and hangs his head down, he sweats for moderate exercise, he declines in flesh, and his urine is high colored.

Now, on a close examination, may be noticed an increased size of the head, or upper jaw, occupying all the space from the eye to the nostril, sometimes on one side, sometimes the other, and not unfrequently on both at the same time. If the disease is unchecked, the horse gradually declines, and becomes so weakened in the loins, that he with difficulty gets about; the nostrils now begin to discharge an offensive sanious matter.

The head continues to enlarge, the irritation is communicated to the brain and destroys the animal.

Many persons here allow them to die, from the belief that the disease is incurable.

Others are in the habit of burning the head with a hot iron, so as to produce a large sore, and, when deep enough to penetrate the outer bone, frequently perform a cure.

The cure in my hands consists in the removal of a portion of the outer table of the bone, over the most prominent part of the enlargement, and establishing a drain from it.

A large incision to be made in the form of a cross, thus ×, and the bone exposed by dissecting back the different points. Then with a surgeon's trephine, or what I used in one case, a common auger,* with a short blunt bit. A few turns of the instrument is sufficient to remove the bone. The wound should then be filled up with a cloth, wet in a weak solution of salt, or any article that will establish a suppurative inflammation. I used in one case the diluted muriatic acid, one part of acid to eight of water, with much benefit.

As soon as the sores begin to matter freely, the stimulating dressings are to be discontinued and the openings syringed out with warm soap suds, and the part dressed every morning with any simple salve, care being taken to prevent the part from healing too soon. If inflammation should supervene, the animal should be freely bled, and the part often bathed in warm water. His food should consist entirely of herbage and green grass. I had two horses put under my care, by a friend of mine, laboring under the worst forms of this disease. I could have purchased both for $25. They were so perfectly cured that one sold for $100 and the other for $125. I am inclined to the opinion, that the disease is mainly produced by blows inflicted on the head by careless servants, &c. H.

* The operating with a common auger may appear rough and uncouth to most persons, but when we reflect, that a trephine is often difficult to procure in the country, and that in that part of the animal's head no vital part presents itself, we consider ourselves justified in using any *domestic* instrument that will fulfil our intentions.

Animal Friendship.—"In the war in Spain some years ago, two horses had long served together in the same brigade of artillery. They had assisted in drawing the same gun, and had been inseparable companions in many battles. One of them was at last killed; and after the engagement the survivor was picqueted as usual, and his food brought to him. He refused, however, to eat, and was constantly turning round his head to look for his companion, sometimes neighing as if to call him. All the care that was bestowed upon him was of no avail. He was surrounded by other horses, but he did not notice them; and he shortly afterwards died, not having once tasted food from the time his associate was killed."

Statistics of the Globe.—The rapid population of the globe is estimated variously from 600,000,000 to 800,000,000; the geographical square miles at nearly 38,000,000, or 49,000,000 English square miles. The population to a square mile is, in France 61, Asia 27, Africa 10, America 3, Oceanica less than 1; the average of all about 17. The densest population in any whole province or state, is in Hamburg, where it is 1302 to a square mile. It is 980 in Bremen, 783 in Frankfort, 523 in Lubec, 464 in Lucca (Italy), 392 in Belgium, 314 in Saxony, 277 in Holland, 257 in Great Britain, the Sicilies 236, 208 in France, Austria 165, Prussia 155, Portugal 121, Denmark 119, Spain 101, Turkey 63, Greece 51, Russia 37.

In Asia some provinces have a population of from 200 to 500 to the square mile; Japan 139, China 42, Siam 57, English Indian Empire 185. In Africa, Morocco has 46, Tunis 45, and some of the interior kingdoms a little more. In America, Hayti has 36, Central America 12, Chili 10, United States 7½, Mexico 6.—[N. E. Farmer.]

Undulating Railway.—A series of experiments have been some time in progress, on a part of the Liverpool and Manchester railway, for the purpose of ascertaining the practicability of a scheme suggested and very strongly entertained by Mr. Badnall, of impelling carriages upon a railway by means of a power derived from the inequalities or undulations of the line. The directors of the railway liberally allowed Mr. Badnall the use of two engines, the Rocket and the Caledonian, and though the temporary defects of the former engine did not at first allow of the experiments being carried to the certainty that the projector desired, they were yet amply sufficient to justify his confidence in the principle. "I consider," says Mr. Badnall, "the results in practice to confirm most fully the advantages shown on the models, and I have not the slightest doubt that it will be found practicable to convey far greater loads from one summit of a curve to another, whose angles do not even exceed that of the Sutton inclined plane, than any locomotive engine can move upon a level road."

There appears to us to be something extremely feasible in this plan; and being one which can be tested by actual experiment, no extraordinary credulity is involved in giving a serious consideration to its practical applicability. It rests upon one of the simplest laws of nature, which is within the daily experience of almost every individual, but heightened, by the facilities of the railway, into a greater efficiency of operation. We all know that a wheeled

vehicle, or any other body, moving freely down a declivity, accumulates a degree of velocity within itself which will propel it a certain distance after it has ceased to be acted upon by the descent of the road. This momentum will be greater in proportion to the greater weight of the body, which is all in favor of the object to which Mr. Badnall purposes to apply it. In order to discover how far the impetus acquired in falling down one slope of an undulating railway would be available in impelling a train of carriages over the next, the experiment is very simple: a certain degree of velocity being given to a load at the foot of an ascent, sufficient to carry it to the summit, we have only to ascertain whether an equal degree of velocity could be given to the load by its own passage down a plane of the same inclination. For this purpose it is only necessary to allow the load to traverse the plane in a reverse direction, and ascertain the velocity with which it again passes the foot of the ascent. The experiments made upon the Sutton inclined plane have fully borne out the correctness of this test, and the result has been so clear and uniform as to leave no doubt as to the soundness of the principle.

Admitting the possibility that the use of steam may be ultimately superseded by this plan, the immense saving which would be accomplished in fuel, carriages, machinery, &c. fills an amazing space in the contemplation, and would be sufficient to counterbalance many attendant disadvantages. Among the principal of these would undoubtedly be the additional capital and labor required for the peculiar construction of such a line of railway, in which a level tract of country, so important a desideratum under the present method, would present one of the most formidable obstacles. We trust, however, that the subject will meet with that serious attention which it unquestionably merits, and in the mean time we publish, with Mr. Badnall's authority, the result of his experiments as recently made.

The following engineers were present, viz. Mr. R. Stephenson, senior, the Messrs. Dixons, Mr. Daglish, and Mr. Badnall, who agreed that the truth and validity of the principle would be effectually determined by the following test:

As great a velocity as possible being attained by the engine *before* reaching a given point on the inclined plane, the *time* was to be accurately ascertained which the train occupied in ascending from that point to a state of rest. The power being then reversed, the time was to be accurately measured which the train occupied in descending from a state of rest to the point from which it had previously ascended. Hence it was obvious, that if the descent was made in less time than the ascent, the velocity generated at the foot of the plane would be proportionably greater than the velocity of the ascending train at the same point, and, consequently, the demonstration would be clear, that the engine and train would not only have ascended to an elevation equal to that from whence it fell, but to a greater one, the extent of which would be in proportion to the velocity attained.

Experiment 1. The Liver engine, and a load of 13 waggons, (weighing in all about 72½ tons,) after traversing a distance of three-fourths of a mile to acquire a sufficient velocity, ran up the inclined plane 278 yards; the time occupied in performing the latter distance being 90 seconds.

Exp. 2. The power being reserved, the engine and train *descended* 278 yards, the time occupied in the descent, viz. from a state of rest to the point from which the time of ascent had been calculated, being only 50 seconds.

Exp. 3. The engine and train having traversed three-fourths of a mile to generate a sufficient velocity, ascended 278 yards in 75 seconds.

Exp. 4. The power being reversed, the descent of 278 yards was accomplished in 40 seconds.

Exp. 5. The ascent of 278 yards was made in 80 seconds.

Exp. 6. The descent of 278 yards was made in 49 seconds.

AVERAGE.

	Total space passed over to generate the velocity.	Time occupied in ascending 278 yards.
Exp. 1,	1,320 yards.	90 seconds.
Exp. 3,	1,320 do.	75 do.
Exp. 5,	1,320 do.	80 do.
Total,	3,960 do.	245 do.
Average,	1,320 do.	81⅔ do.

	Total space passed over in generating velocity on inclined plane.	Time occupied in descending 278 yards.
Exp. 2,	278 yards.	50 seconds.
Exp. 4,	278 do.	40 do.
Exp. 6,	278 do.	49 do.
Total,	834	139
Average,	278	46⅓

It is almost needless to add that these experiments have most fully confirmed the undulating principle, and proved, beyond all doubt, that a locomotive engine and load can traverse a curve or undulation whose two summits are of equal altitude with much greater rapidity, and, consequently, with far greater economy of *time* and *power*, than a level road of proportionate length.

Mr. Badnall having intimated his opinion, that if a velocity of twenty miles an hour were attained at the foot of the plane by two engines, it would be proved by experiment that an engine could move, from one summit of an undulation to another summit nearly, if not quite, *double* the load which that engine was capable of moving on a level, it was determined by the gentlemen present to decide this important question in the course of a few days.

THE UNDULATING RAILWAY.—For the purpose of further testing this important principle, several experiments have been tried since our last publication, of which the subjoined is the result:

It was determined by the engineers who witnessed the last experiments, that another trial should be made to prove the possibility or otherwise of conveying on an undulating line double the load which the engine was capable of drawing, at a like velocity on the horizontal railway.

The only day on which it was thought this experiment could safely and satisfactorily be made was on a Sunday; in consequence of which, on Sunday week a train of loaded carriages, weighing 150 tons, exclusive of the two engines which moved them and their tenders, left Manchester for the Sutton inclined plane.

On this occasion it may, in truth, be said that there never was a more friendly assemblage of mechanical men. It is well known to some of our readers that the French Government have selected a body of the most eminent engineers in that country to visit England, with a view of acquiring all requisite information preparatory to the construction of the intended French lines of railway. These gentlemen, nine in number, were all present; the English engineers who attended being Mr. Robert Stephenson, senior, the Messrs. Daglish, Mr. Dixon, and Mr. Badnall, in addition to whom were nearly all the practical mechanics connected with the railway, and many others, (among whom was Mr. Case, of Summerhill, and Mr. Garnett, of Manchester,) who felt a deep interest in the result.

The following statement is an undeniable corroboration of the favorable opinion which we have before expressed on this subject.

Mr. Badnall had proposed, as an extreme test of the merits of the undulating principle, that meaning:

Experiment 1. Two engines, the Firefly and the Pluto, brought the whole train of waggons, (the length of the train was about 151 yards,) weighing 150 tons, exclusive of engines and tenders, to a given point at the foot of the Sutton inclined plane, the velocity attained at this point being about 19 miles per hour. The Pluto then left the train and the Firefly ascended with the load 575 yards in 116 seconds; the distance traversed by the two engines to generate the velocity before ascending being at least one mile.

Exp. 2. The power of the Firefly being reversed, the engine and load *descended* 575 *yards* in 74 *seconds*; the velocity attained at the foot of the plane being *far greater* than at the same point when *ascending*.

Exp. 3. The Firefly and Pluto having traversed 1 mile to generate a velocity of 1[illegible] miles an hour, and the Pluto then leaving the train, at the foot of the inclined plane, the Firefly and load ascended 315 yards in 90 seconds.

Exp. 4. The Firefly's power being reversed, the whole train descended 315 yards in 65 seconds.

Exp. 5. The same engines and load, working about 1¼ miles, attained a velocity of 18 miles an hour; the Pluto left as before, and the Firefly and load rose 457½ yards in 102½ seconds.

Exp. 6. The Firefly and train descended 457½ yards in 80 seconds.

N. B.—On this occasion some delay occurred in reversing the power, which will account for the comparative difference in time.

Exp. 7. The two engines, as before, attained a velocity of 18 *miles* an hour at the foot of the ascent, the Pluto then left the train, and the Firefly shut off her steam, the whole train then rose, *by momentum only*, 332 yards in 70 seconds.

Exp. 8. The train descended (the Firefly working) 323 yards in 66 seconds.

The preceding experiments undoubtedly prove two most important facts, not only that a locomotive engine can convey, on an undulating line, double the load which it is capable of conveying at the same velocity on a level, *but that it can accomplish* this by the employment of *only one half its power*, which last-mentioned fact was decided by the last experiment.

SUSPENSION RAILWAY.—We have frequently been asked how the Suspension Railway is constructed; and how, when constructed, it could be used to any purpose with but *one rail*. Of the suspension railway we had heard much said, but had seen no description from which a correct idea could be formed, and therefore could not give an answer. The great object of the Journal, however, being to furnish information to all who wish it, relative to all kinds of railways, we took measures to obtain, through a friend in Boston, from the patentee, Henry Sargent, Esq., such a description, accompanied with drawings, as will enable any person to understand the principle upon which this cheap and convenient mode of internal improvement is constructed. There is certainly much ingenuity displayed by the inventor, in the construction of his model; and although we are not altogether satisfied that the invention will prove of great importance in practice, yet we consider it well worth the attention of those engaged in the construction of railways, as we are every day more convinced that we are only at the *threshold* of a successful tide of experiment in the construction of railroads. We are, in truth, at this time only *beginning* to learn to construct railways. Twenty years will do for railways what the same period has done and *is now* doing for *steamboats*. Instead of costing *twenty* or *thirty* thousand per mile, and travelling 15 to 25 miles per hour, they will be constructed for one-half the money, and we shall be able to travel at the rate of twenty-five to forty miles per hour. This, we are aware, will, by some, be deemed visionary; yet a moment's reflection upon the rapidity and extent of the improvements of this country for a few years past, will convince any one that the past warrants even greater expectations than is here predicted.

The *suspension* railway has not heretofore

been properly brought before the public. We shall, however, endeavor to obtain, as we trust we shall be able, from the gentleman who has so obligingly furnished us with the following, further descriptions, with accounts of its performances, &c., by which a more correct opinion may be formed of its merits.—[American Railroad Journal.]

SUSPENSION OR SINGLE RAIL RAILWAY.—Imperfect descriptions of this invention have been published in pamphlets and newspapers, in England and America; erroneous impressions, however, have existed in regard to it, which it is the object of the writer to remove. The erection of the Single Rail Railway in England, and similar experiments in this country, have demonstrated this invention to be practicable, and no one doubts its utility. The superior excellence of this Railway, in comparison with all others, lies in its economy; a point which, it cannot be denied, in the ardor of speculation, is not always sufficiently regarded. The very simplicity and cheapness of an article are not unfrequently the cause of its condemnation, since it is neither "dear-bought nor far-fetched:" considerations, which seemingly enhance the value of our possessions. All other advantages being equal, economy must turn the scale in favor of the Single Rail Railway. To avoid the effects of frost and snow, the foundations of all railways, *in this climate*, must be equally deep, and their tops more or less elevated. It is not perceived that this kind of railway is inferior to any other, in its capacity for the transportation of heavy loads; nor in those facilities, by which it accommodates itself to every purpose of transportation. It is manifest that no estimate of any railway, per mile, can be made, without a full knowledge of its location, and of the tonnage, *per wheel*, intended to be transported; for the more the weight is distributed, the lighter and less costly may the railways be. The Single Railway must always be less expensive, other things being equal.

Should the surface of the route be unequal, the plane of the rail may be maintained, by elevating it to a reasonable height on posts of unequal length. From this circumstance, it must appear to the most casual observer, that a great *additional* saving in embankments, culverts, bridges, drains, &c. is claimed for the Single Railway. It has been objected to the Single Railway, that it is occasionally elevated, for the reasons above stated. But is this a comparative objection? Is it not common to both, and to all? The double railway at Quincy passes over intervals, in some places, twenty feet deep; and the rails, and *horse path also*, are elevated accordingly. Yet the railway at Quincy was constructed expressly for the transportation of heavy maisses of grte.an All writers, on the subject of railways, have adverted to lateral pressure, as a point of great consideration. This effect is inseparable from the very nature of the double rails. But in Single Railways much less allowance is required for lateral pressure: hence it is believed that the single rail can carry more than the double, in proportion to the number of wheels employed; for friction is diminished, in proportion as the lateral pressure is taken away. This lateral pressure causes the flanges of the wheels to rub on the sides of the rails, and corresponding effects are produced, at all the axles of the wheels; for the load on the double rail is immediately upon the axles, communicating its impulses directly and entirely to them.

On the single rail, such is not the case: the load is placed at the ends of the bars, and all motion is necessarily diminished at the axles, which are very *short*, and may be made much *less* than usual, as they are not compelled to bear those shocks which result from lateral pressure. The late experiments in England have demonstrated the superior power of the Single Railway, for the carriage of heavy burthens, attributable, in a great measure, to the causes above recited.

The most perfect steadiness of motion is secured to the carriage, on the Single Railway, by the late additional improvement of the friction rail and rollers: being a slender rail or rod placed on one side only of the supporters, and which bears the pressure of a few pounds only, amounting to nothing more than a slight difference, in the two parts of the load, and causing the heavier side to bear lightly on the friction rail. This pressure amounts to nothing more than that which occurs in adjusting the loads of common carts and trucks, with this difference, that the pressure is maintained longitudinally in the one case, and laterally in the other. It has been supposed, that a precise equipoise of the two portions of the load was indispensable. This is by no means required: a *difference* may exist of two for one, as a leverage takes place, which prevents all ill effects from such cause.

On the Single Railway, the load is more easily put on and taken off. The single rail may be more easily maintained in its proper position; the supporters and their foundations are not likely to be affected, by ordinary causes. The foundations are below the influence of frost, with several feet of heavy stone abutment on both sides, or packed with good gravel, unmixed with perishable earth. Should any change take place, which is not expected, as the pressure of the load is perpendicular, the carriage may still follow the inequalities of the single rail; whilst any considerable change in the position of either rail of the double railway must obviously impede all progress for a time, as effectually as it would be impeded on a common road by a fallen tree, or similar obstruction. This railway may be made of wood, stone, or iron: if wood, various means may be employed for its preservation.

It is not believed that, in point of facilities, any railway is superior to this which is now recommended. As in other railways, so in this, hills are ascended and descended; roads are crossed, above or below, as they are crossed by canals, and by other modes; the passage of streams is effected on piles, or in *railway boats* particularly adapted to this object. It has been objected to the Single Railway, that, because of its elevated position, it must impede the common travel, which may lie across its path. We have already shown that this elevation is unavoidable, and that all objections, on this score, are general, and applicable to every species of Railway, *in this climate:* for all railways are elevated; the single, on the posts, and the double, on embankments and supporters also.

Crossing places are required, in both single and double railways, at eligible points, and can as easily be made in the former, as in the latter.

The passings or turnouts are effected with as much ease, on the single as on the double railway, as the following sketch may demonstrate:

Let the figures 1, 2, 3, represent the single elevated railway, with the portions 4, 4, thrown back, on simple but strong hinges or joints, which, when closed, form their respective parts of the railway, being fastened by a simple latch.

Figure 6 represents the turnout. 5, 5, two curved portions of the sideling or turnout, moved on strong joints; when closed, as in the sketch, connecting those parts of the rail 1, 3, with the sideling 6. A light carriage, travelling fast from 1 to 3, will at all times pass a slow carriage and take the lead of it, by turning on to the curved rail 5, to the sideling 6, to the main rail 3. The driver of the slow carriage having ample time, without stopping his carriage, to step forward and close the straight bar 4, and open the curved bar 5, with one motion of his hand, they being connected at bottom, (see dotted lines.) The slow carriage passes on to the main rail 2, and the driver replaces the bars as in the sketch, or they may be replaced mechanically; the fast carriage, coming up in the meanwhile, passes forward, the slow carriage being at No. 2. This mode is more particularly adapted to two Single Railways—one for going and the other for returning; but it may be used with advantage travelling both ways on one rail—and is similar to the mode adopted on the double rail, except that there are no cast iron plates with grooves, &c. which probably will not be very convenient in our frosty climate—especially as there are many of them at each sideling. The annexed drawing is a perspective view of the single elevated railway and carriage, which may be raised on supporters of two and a half or three feet on level ground, and more on an uneven surface, as circumstances may require.

The carriage cannot overturn, or incline farther than the friction rail, and may be of any ordinary breadth and length, and braced and strengthened as may be thought proper, and easily adapted to its particular use; and if the centre of gravity is below the top of the rails, the load may be placed higher than the top of the wheels, which, if the above principle be regarded, may be of the largest diameter; and even regardless of this principle, if the friction rail and rollers be employed.

If any objection exist, in relation to the Single Railway, such objection should be very formidable when opposed by considerations of great economy, superior advantages, and peculiar applicability to our own country.

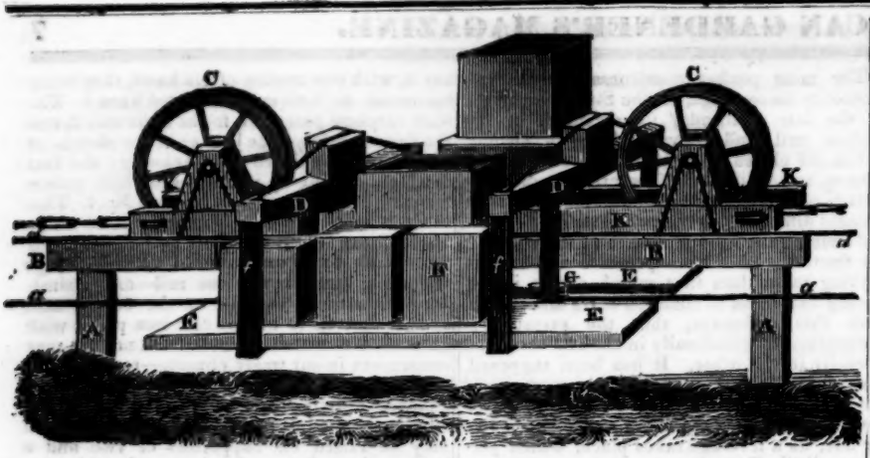
Boston, April 30th, 1827.

SUSPENSION RAILWAYS.—Many years ago, after the subject of railway transportation had begun to excite general attention both in England and America, the suspension or single railway was invented *originally* by Henry Sargent, Esq. of Boston, Mass. This invention (for, as the English writers say, it can with no more propriety be called an improvement than the plough can be called an improvement of the spade,) did not for many years attract the attention which its importance appears to deserve, and it remained for a long time without benefit to the public or advantage to the inventor and patentee. Circumstances, which we shall by and by refer to, took place about twenty years ago, which tended to make this railway better known; but at the same time Mr. Sargent found that he was in some danger of being deprived of his fame as inventor, and his right as patentee; and he consequently took some prompt measures to vindicate both.

Among other railways of Mr. Sargent's invention in the United States, there are now two in the county of Suffolk, Massachusetts: one at Chelsea, of a circular form, and a few hundred feet in extent, is used only for purposes of amusement, and is in fact a deviation from his original invention, and no more than an extensive model. The other, at East Boston, is a suspension railway, as lately improved, and has been commenced within a few months; and is not yet entirely completed. This railway is constructed over a marshy piece of ground, full of creeks and ponds, and much more unfavorable than the average surface of the country.

By the help of the plate, which, with the exception of the friction rail, *a a*, represents the railway and car, as first invented, we shall endeavor to convey some idea of the principles of the suspension railroad, and then to point out the improvements which have been subsequently made.

A A are the wooden posts driven or otherwise secured into the earth, upon which the rail is to be supported. The ground in the annexed plan presents a level surface, not requiring any difference in the length of the supporters. But where the surface is uneven, these can be left of unequal length, and braced every



three feet from the top of the rail, according to the undulations of the surface, so that the tops of the supporters shall be on the same level. There have been various expedients suggested for securing these posts in the ground, in order to diminish the tendency to incline from the vertical posture, by the weight and motion of the loads which they are destined to bear. The lower extremities of the posts should be sunk in transverse trenches to a depth of four or five feet, more or less, and placed upon a foundation of hard earth or stones. The sides should be filled up with rubble stones, or otherwise braced. The post should be supported, (in marshy soils,) by at least one strong timber, placed obliquely in the ground and bolted into it, by which it will be stiffened by the oblique timber, and secured from inclining in the opposite direction.

B B is the bearing rail, made of strong timber, of dimensions proportioned to the weight intended to be supported. This rail is to be firmly fixed upon the supporters with mortice and tenant. When the wheels C C are intended to be guided with flanges, it is advisable to have the top of the rail shod with iron, *d d*, in order to prevent the flanges from fraying, or, as it is called, brooming the sides of the rail, and thereby wearing it out and making it uneven. C C are the wheels, placed one before the other, in a direct line on the rail, and provided with flanges on either side, to keep them in position. From the axles of these wheels are suspended the horizontal bars or frame work, K K, to which the cars for passengers or merchandize are connected by the transverse bars D D, and strong, inflexible frame *f f*, so that the cars are balanced on each side of the rail, like the bags of a pack saddle. F is the loading placed on the cars in readiness for transportation. It might be objected by persons not acquainted with mechanics, that this method of transportation is unsafe, because there being but one line of wheels, the cars would be overturned, unless the load is very equally balanced on each side of the rail. It is of course better that the load should be so balanced, but it could very easily be shown in practice it is impossible that the cars can be overturned when the materials hold together. When one side is heavier than the other, a slight inclination of the heavier side takes place, and that is all; for as soon as the heavier side begins to incline, it approaches the centre of gravity, and is thus continually losing its tendency to incline, and cannot incline further than the supporters, as the car is longer, &c.; while, on the other hand, the lighter side is receding from the centre of gravity, and is consequently gaining power to balance the other by the leverage which takes place. We have frequently seen that a person carrying a single pail of water will extend his disengaged arm at right angles with his body, and by this simple instinctive motion, one arm alone is made to balance the other with a weight of twenty pounds at the end of it. A very great additional security is derived from the very low position of the centre of gravity, owing to the load being placed below the wheels, instead of above or on a level with them, as is the case in common carriages. It is also impossible that the car should be overturned in case of the breaking of the axles, for the load being on each side of the rail, and below the centre of gravity, the body of the car would fall but one-fourth of an inch, and slide on the rail, if in motion, and there be firmly supported. Such are the general principles of the suspension railway as originally invented by Mr. Sargent.

A few years ago the plan of a railway precisely similar in its nature was submitted to the British public by H. R. Palmer, Esq., and it has been generally noticed in English scientific works as Palmer's Patent Suspension Railway, no acknowledgement being made of Mr. Sargent's prior claim. It is impossible to say whether the English inventor had taken any hints, either directly or indirectly, from the American. We do not know that he had ever heard of it, but it is very certain that the latter could have had no possible assistance from the former, because he had demonstrated its practicability by actual experiment, many years before it was mentioned on the other side of the Atlantic. This discussion, however, is of little consequence. Newton's argument, with regard to Leibnitz's alleged discovery of fluxions and the differential calculus, applies with equal force to this case. Whether Mr. Leibnitz invented it after me or had it from me, is a matter of no consequence, as second inventors have no rights.

Mr. S. has subsequently made several improvements upon his first invention, which have been in part adopted in his railway at East Boston. The most important of these is the friction rail, *a a*. Although it is impossible for the car to be overturned, yet as it is supported only on a single line of motion, but on the whole breadth of the wheel, it would be apt, except in cases where the load is composed of inert matter, and very nicely balanced, to have an oscillating vibratory motion on the rail. To prevent this the small rail *a a*, made of wood, is fastened on each side of the supporters A A, and to prevent friction from the sides of the car, a wheel *b*, on a vertical axis, is placed under the floor of the car, to run horizontally upon the rail. The pressure upon this rail is very trifling, amounting to much less than the difference of weight between the two sides of the loaded car, because the overloaded side having a tendency to descend in a perpendicular line, the oblique pressure upon the friction rail is smaller than the whole tendency of the loaded side to descend. The rail may therefore be of a small size, and can be furnished at a very trifling additional expense; and by means of it, the car, even with a shifting and varying load, will be kept as steady as if upon a double track.

Another great improvement has been suggested with regard to the wheels. If the wheels are kept on the main rail by flanges, as in the plate, it is absolutely necessary that the rail should be shod with iron, which causes a very great additional expense. If this is not done, the continual friction of the flange on the edge of the rail will cause it to fray or broom as before stated. To obviate this difficulty, the wheels may be made wider than the rail, without flanges, to run freely upon the smooth surface of the rail, and to keep their direction, guided by rollers, of which the place only can be seen in the plate, may be placed horizontally at *c c*, to run on the side of the rail, thus answering every purpose of the flange, but with a much smaller degree of friction, and with a saving of the whole expense of the iron guard for the rail.

A due regard being had to the principles above stated, the cars intended to be put upon the railway may be varied according to the nature of the articles to be transported, and the fancy or taste of the proprietor. The railway at East Boston is, as we have before said, built over a tract of marshy land of a peculiarly unfavorable nature. The supporters are piles driven through the marsh to a stratum of blue clay beneath, and strengthened by oblique braces. Being merely an experiment, the cars to be placed upon it are intended only for the transportation of passengers to a place of entertainment, at the farther end of it.

The only serious objection that has been made to the suspension railway is, that, being elevated so far from the ground; it may not be so sufficiently permanent, and so capable of bearing heavy loads, at a *rapid* rate, as the iron rails which are elevated only a few inches. We do not wish to discuss this question, though many persons, whose opinions in these matters are of great weight, believe that it may be made sufficiently permanent for all practical purposes. But it is not at all necessary for the usefulness of the suspension railway, that it should be in every respect as capable of enduring heavy loads as the railway now most usually constructed. The important question is, whether, taking into consideration the expense of its construction, the cost of transportation upon it will be less than upon an ordinary road. If this point is established, as it has been, beyond all doubt, its importance is manifest. There are many parts of the United States where the increase of population and of business calls for greater facilities of communication; yet the travel is not sufficient to support the enormous expense of the double iron railway. There are other sections so rugged and uneven, that whatever might be the amount of travel, it could not pay the expense of embankments, excavations, and other works necessary for attaining the level required for the road. In all such cases the suspension road, on account of its comparatively trifling expense, can be used to great advantage. The average cost of a suspension railroad, built with prudence and economy, extending over a country the surface of which presents no peculiar advantages or disadvantages, is about one quarter of that of the double track iron road now in use, and this difference is increased in proportion as the country, over which the road is to be constructed, is more rugged and uneven than usual. Now suppose that the suspension road is only capable of bearing one third of the momentum which the other road can bear, (and this is certainly a greater allowance than it would be necessary to make in practice,) yet the cost being one fourth that of the other, and its power one third, it follows, of course, that the suspension road would be much the most economical.

In a new country, therefore, where means are limited, it must be of immense advantage. Its merits have not hitherto been generally known. It has been but very little used in England, probably on account of the high price of timber, and on this side of the Atlantic we have been slow to adopt suggestions that have not been proved and tested by experiment. But it is now getting into more extensive favor in those parts of the country where timber is abundant. It will, no doubt, in a short time, prove a most important method of inland transportation.

On the Microscope—Method of Constructing, &c. [From Partington's British Cyclopædia.]

The history of this instrument is veiled in considerable obscurity, and among the moderns the discovery of the microscope has been claimed by several individuals. The ancients appear to have been acquainted with it in one of its forms; for Seneca says, "Letters, though minute and obscure, appear larger and clearer through a glass bubble filled with water." In the middle ages this knowledge was lost. The invention of the modern instrument is attributed by the celebrated Dutch mathematician, Huygens, to a countryman of his, named Drebell, who constructed them about 1621, or 31 years after the invention of the telescope. Borelli attributes it to Jansen, the reputed contriver of the telescope; Viviani to Galileo. The first compound microscope, consisting of two double convex lenses, seems to have been made by F. Fontana, a Neapolitan, who dates his invention from the year 1618.

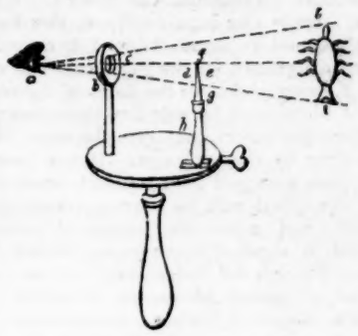
The numerous forms of microscopes may be included under the heads of single, compound refracting, and compound reflecting microscopes. The theory of the *single microscope* may be thus explained: We all know that at a small distance we see more distinctly than at a large. If we look at two men, one 200 feet distant, the other 100 feet, the former will appear only one half the height of the latter, or the angle which the latter subtends to the eye of the observer will be twice that subtended by the former. Hence we must conclude that the nearer we can bring an object to the eye the larger it will appear. Now if, to render the parts of a minute object distinguishable, we bring it very near the eye, (suppose within one or two inches,) it will become very indistinct and confused, in consequence of the great divergence of the rays of light from the object, and the power of the crystalline lens of the eye not being sufficient to collect the rays whereby an image of the object may be formed on the retina at the proper distance on the back of the eye. Now, if we employ a single microscope, which consists of a convex lens, usually made of glass, (though any other transparent substance would have the same power in a greater or less degree,) and mounted in a brass setting, and place it between the object and the eye, the former being in the focus of the glass, the diverging rays from the object will be refracted and rendered parallel by the lens, and thus we shall obtain a distinct and near view of the object. The increase of apparent magnitude obtained by the employment of lenses is proportioned to the difference of the distance of an object from the lens and the distance when seen without its assistance. This latter distance, (the distance of distinct vision of minute objects with the naked eye,) varies in different persons, and at different periods of life. Some measure, therefore, must be assumed as a standard, before we can express the amplifying power of a lens, so as mutually to have the same idea of the magnitude of an object. Some authors adopt ten inches as the standard of the focus of the eye, under ordinary circumstances, and its decimal character makes it a convenient multiplier or divisor. With this decimal standard we can determine the magnifying power of lenses of any focal length, or formed of any substance (media.) Thus, if we have a lens which requires for distinct vision the object to be one inch from its centre, (in a double convex,) we must divide the standard ten by one, which will give ten as the magnifying power. If the lens require the object to be $\frac{1}{25}$ of an inch distant, its magnifying power will be 250. We have called the magnifying power in the first instance ten, because the length of the object is increased ten times; but, as its breadth is also increased ten times, the real magnifying power of the lens is ten times ten, or 100. The common form of the magnifiers employed for microscopes is double convex, and they should be made as thin as possible; for the wandering or spreading out of the rays proceeding from an object when refracted by a lens with spherical surfaces, whereby an indistinctness is produced in its image, will be decreased as the square of the thickness of the lens employed, and the loss of light in passing through the lens is less in proportion as it is thin.

Within a few years diamonds have been formed into lenses in consequence of their high refractive power, whereby we can obtain lenses of any degree of magnifying power with comparatively shallow curves; and, as the dispersion of color in this substance is very low, the lens is nearly achromatic. Next to the diamond the sapphire possesses all the powers requisite for the formation of perfect magnifiers, and presents less difficulty in their construction; hence the expense of employing it is considerably less.

A *compound refracting microscope* is an instrument consisting of two or more convex lenses, by one of which an enlarged image of the object is formed, and then by means of the other, employed as an eye-glass, a magnified representation of the enlarged image is obtained. The distance at which the two lenses of a compound microscope are placed from each other must always exceed the sum of their focal lengths, in order that the image may be formed by the object-glass in the anterior focus of the eye-glass. Compound microscopes have been constructed of almost all possible dimensions, from a few inches in length to twenty feet; but from experience it appears that whenever their magnitude is augmented beyond a certain point the effect is diminished, though we suppose the amplifying power of both microscopes the same.

The *solar microscope* consists of a common microscope connected with a reflector and condenser, the former being used to throw the sun's light on the latter, by which it is condensed to illuminate the object placed in its focus. This object is also in the focus of the microscopic lens on the other side of it, which transmits a magnified image of it to a wall or screen, (sometimes a combination of two magnifying lenses is used.) The magnifying power will be greater in proportion as the focal distance of the object-glass compared with the distance of the wall or screen from the object-glass is less. The principle of the *lucernal microscope* is the same, except that a lamp is used instead of the sun to illuminate the objects; this lamp is enclosed in a lantern, to screen the light from the observers.

Having thus given a general outline of the arrangement of the microscope in its various forms, it will now be advisable to furnish our readers with such graphic and descriptive particulars as will enable any ingenious workman, reading this article, in conjunction with our treatise on Optics, (which will be inserted hereafter,) to construct the instrument. To render this systematic and intelligible, it may be advisable to commence with the most simple form.



A very convenient form of microscope is shown in the preceding engraving, where *b* is a circular piece of brass or ivory, in the middle of which is a small hole, one-twentieth of an inch diameter: in this hole is fixed, with a wire, a small lens, whose focal distance is *c d*. At that point is placed a pair of pliers, *g h*, which may be adjusted by means of the sliding screw, as in the figure, and opened by means of two little studs. The object may be viewed with the eye placed in the other focus of the lens at *a*; and, according to the focal length of the lens, the object, *f*, will appear more or less magnified, as represented at *i l*. If the focal length be half or one-fourth of an inch, the length, surface, and bulk, of the object will be magnified in a similar proportion. This small instrument may be put into a case for the pocket. Those lenses whose focal lengths are three-tenths, four-tenths, and five-tenths of an inch, are the best for common use.

Since the nearer the eye can approach to an object the larger it appears, it is plain, a double and equally convex lens magnifies more than a plano-convex lens; because, if the sphere or convexity be the same, the focal length of the former is but half that of the latter; and, since the double convex consists of two segments of a sphere, the more an object is to be magnified, the greater must the convexity be, and therefore the smaller the sphere; till at last the utmost degree of magnifying power will require that these segments become hemispheres, and, consequently, the lens will be reduced to a perfect spherule, or very small sphere.

If the radius of the spherule be one-tenth of an inch, the eye will have distinct vision of an object by means thereof, at the distance of $1\frac{1}{2}$ radius, (that is, three-twentieths of an inch,) and, as this is but the fortieth part of six inches, the length of an object will be magnified forty times, the surface 1600 times, and the solidity 64,000 times, by such a small sphere.

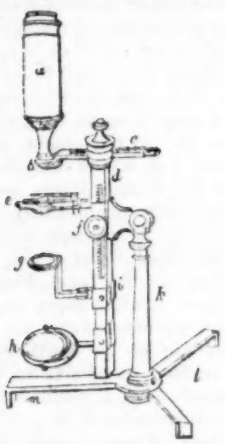
If the radius of a spherule be but one-twentieth of an inch, then will the eye have distinct vision of an object at the distance of three-fortieths of an inch, and as this is but the eightieth part of six inches, the length of objects will appear eighty times greater, the surface 6400 times, and the bulk 512,000 times greater, to the naked eye at six inches distance.

In using these spherule microscopes, the objects are to be placed in one focus and the eye in the other; and since the focus is so

exceedingly near the glass, it is impossible to view any but pellucid bodies; for, if any opaque object were to be applied, the eye being, as it were, just on the spherule, would entirely prevent any light falling on it, and it would be too obscure to be viewed.

To remedy this inconvenience, the focal length should be increased and a concave mirror substituted for the plate *b*. The object, *f*, being placed in the focus of the mirror, is illuminated by reflected light, and the most opaque insect may thus be seen with advantage to the naturalist. If the instrument thus arranged be directed towards the sun, the effect will be very materially improved; and when this cannot be accomplished, a sheet of white paper should be placed beneath the instrument.

The *compound microscope*, as made by Messrs. Jones, of Holborn, is shown in the engraving beneath. The body of the in-



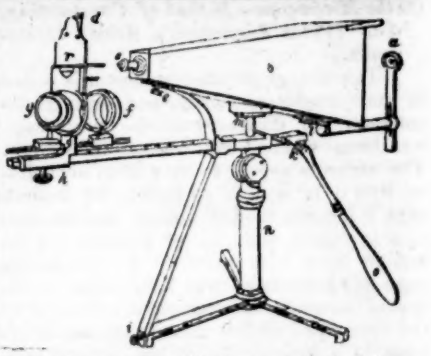
strument, *a*, is screwed to the horizontal sliding arm, *c*. At *b* is a circular plate, containing a series of glasses, varying in their magnifying power. The objects to be magnified are placed in the stage, *e*, and the proper focus obtained by moving the rack at *f d*. The lens *g* is employed to concentrate the light of a lamp, or that of the sun, on the object to be examined. The reflector at *h* has two mirrors, the one concave, the other flat. The whole instrument is supported by the pillar, *k*, and the triangular stand, *l m*.

The great facility with which objects can be represented on paper, or a rough glass, in the camera obscura, and copies drawn from them by any person, though unskilled in drawing, evidently suggested the application of the microscope to this instrument. The greatest number of experiments that appear to have been made with this view, were by Mr. Martin and Mr. Adams, the former of whom frequently applied the microscope to the portable camera, and with much effect. But these instruments being found to answer only with the assistance of the sun, Mr. Adams directed his experiments to the construction of an instrument of more extended utility, which could be equally employed in the day and by night. He accordingly succeeded so far as to produce, by candle-light, the images of objects refracted from a single magnifier, upon one or two large convex lenses (of about five inches, or upwards, in diameter,) at the end of a pyramidal-shaped box, in a very pleasing manner, so as to give opaque objects, as well as transparent ones, the utmost distinctness of representation; but still the light of a candle, or lamp, was found generally insufficient to throw the requisite degree of illumination on the objects. The invention of the Argand lamp offered a complete remedy for this defect, by the intensity and steadiness of its light.

The advantages of this excellently-conceived instrument are numerous and important. "As the far greater part of the objects which surround us are opaque," says Mr. Adams, "and very few are sufficiently transparent to be examined by the common microscopes, an instrument that could be readily applied to the examination of opaque objects has always been a desideratum. Even in the examination of transparent objects, many of the fine and more curious portions are lost, and drowned, as it were, in the light which must be transmitted through them; while different parts of the same object appear only as dark lines or spots, because they are so opaque as not to permit any light to pass through them. These difficulties, as well as many more, are obviated in the lucernal microscope, by which opaque objects of various sizes may be seen with ease and distinctness, the beautiful colors with which most of them are adorned are rendered more brilliant, without changing in the least the real tint of the color, and the concave and convex parts retain also their proper form. The facility with which all opaque objects are applied to this instrument is another considerable advantage, and almost peculiar to itself: as the texture and configuration of the more tender parts are often hurt by previous preparation, every object may be examined by this instrument first as opaque, and afterwards (if the texture will admit of it) as transparent. The lucernal microscope does not in the least fatigue the eye; the object appears like nature itself, giving ease to the sight and pleasure to the mind: there is also, in the use of this instrument, no occasion to shut the eye which is not directed to the object. A further advantage peculiar to this microscope is that by it the outlines of every object may be taken, even by those who are not accustomed to draw; while those who can draw well will receive great assistance, and execute their work with more accuracy, and in less time, than they would otherwise have been able to have performed it. Transparent objects as well as opaque may be copied in the same manner. The instrument may be used at any time of the day, but the best effect is by night; in which respect it has a superiority over the solar microscope, as that instrument can be used only when the sun shines.

"Transparent objects may be examined with the lucernal microscope in three or four different modes, from a blaze of light almost too great for the eye to bear to that which is perfectly easy to it; and, by the addition of a tin lantern to the apparatus, may be thrown on a screen, and exhibited at one view to a large company, as by the solar microscope."

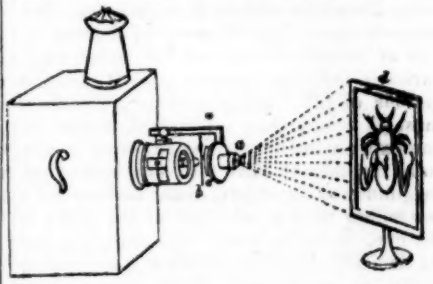
In the next column we give a view of this instrument, mounted to examine opaque objects. *b* is a large mahogany pyramidal box, which forms the body of the microscope; it is supported firmly on the brass pillar, *n*, by means of the socket, *m*, and the curved piece, *e*. *a* is a guide for the eye, in order to direct it in the axis of the lenses; it consists of two brass tubes, *l*, one sliding within the other, and a vertical flat piece, at the top of which is the hole for the eye. The



inner tube may be pulled out, or pushed in, to adjust it to the focus of the glasses. The vertical piece may be raised or depressed, that the hole through which the object is to be viewed may coincide with the centre of the field of view; it is moved by a milled screw, which could not be shown in this figure. At *l* is a dove-tailed piece of brass, made to receive the dove-tail at the end of the tubes, by which it is attached to the wooden box. The tubes may be removed from this box occasionally, for the convenience of packing it up in a less compass. At the small end of the cone is placed a tube, which carries the magnifiers, one of which is represented at *c*; the tube may be unscrewed occasionally from the wooden body. Beneath the cone is placed a long square bar, which passes through and carries the stage or frame that holds the objects; this bar may be moved backward or forward, in order to adjust it to the focus, by means of the pinion, *k*. A handle furnished with a universal joint, for more conveniently turning the pinion, is shown at *o*. When the handle is removed a nut may be used in its stead. The stage, *h*, for opaque objects, fits upon the bar by means of a socket, and is brought nearer to or removed further from the magnifying lens by turning the pinion, *k*; the objects are placed in the front side of the stage. The two upper pieces of brass, *r*, are moveable; they are fixed to a plate, which is acted on by a spiral spring, that presses them down, and confines the slider with the objects: this plate, and the two upper pieces of brass, are lifted up by the small nut, *d*.

At the lower part of the stage there is a semi-circular lump of glass, *g*, which is designed to receive the light from the lamp, and to collect and throw it on the concave mirror, *f*, whence it is reflected on the object. The upper part of the opaque stage takes out, that the stage for transparent objects may be inserted in its place.

Another still more simple mode of effecting the same object is shown beneath:

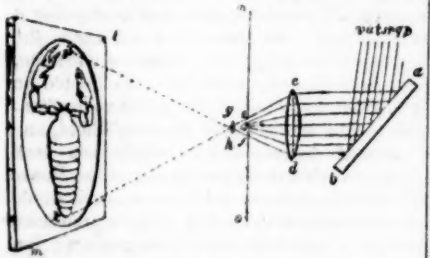


The lantern is provided with a sliding tube for the introduction of the objects to be magnified. The moveable lenses are shown at

a. Other objects differing in their character may be placed in the forceps, *b*, attached to the sliding frame by the plate *c*. A plate of ground glass, shown at *d*, serves to receive the figure of the object.

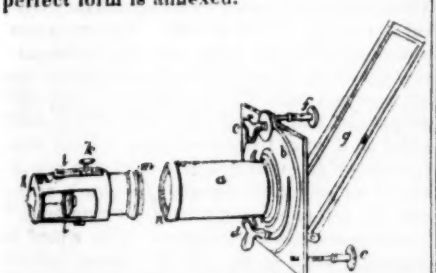
The mode of constructing the *solar microscope* may now be illustrated.

It is shown in its simplest form in the engraving below, in which *a b* is the diago-



nal mirror for receiving the rays of light, *p q r s t u v*. They are reflected by the polished surface, and thrown on the lens *c d*. Within the focus, at *e f* is placed any transparent object to be magnified, and the image thus illuminated passes through the lens *g h*. The size of the magnified figure, *i k*, will depend on the distance the instrument is placed from the wall *l m*. The room should be darkened, which is usually effected by employing a large shutter at *n o*. Mr. Baker, speaking of this instrument, says, "that it has conveniences attending it which no other microscope can have: for the weakest eyes may use it without the least straining or fatigue. Numbers of people together may view any object at the same time, and by pointing to the particular parts thereof, and discoursing on what lies before them, may be able better to understand one another, and more likely to find out the truth, than in other microscopes, where they must peep one after another, and perhaps see the object neither in the same light nor in the same position. Those, also, who have no skill in drawing, may by this contrivance easily sketch out the exact figure of any object they have a mind to preserve a picture of, since they need only fasten a paper on the screen, and trace it out thereon, either with a pen or pencil, as it appears before them. It is worth the while of those who are desirous of taking many draughts in this way, to get a frame, in which a sheet of paper may be placed or taken out at pleasure; for, if the paper be single, the image of an object will be seen almost as plainly on the back as on the fore side; and, by standing behind the screen, the shade of the hand will not obstruct the light in drawing, as it must in some degree when one stands before it."

A valuable solar microscope of the most perfect form is annexed.



The square plate *b c d* is attached to the window-shutter by the screws *e f*. The glass plate *g* is mounted in a brass frame, and may be elevated or depressed by a screw at *d*. A rotatory motion is communicated by a pinion and handle at *c*, which acts on a large wheel concealed by the square plate. The first lens is placed in the tube *a*, immediately adjoining the mirror. Another tube *m* is attached by a screw at *n*, and contains two small lenses, and the rack-work, *k l*, for adjusting the focus of the instrument. The objects are introduced at *i*; those best fitted for exhibition are the wings of insects, and the cuttings of wood. When glasses of high power are employed at *h*, they are now constructed on the achromatic principle.

We may now proceed to furnish our readers with some necessary particulars respecting the method of using microscopes. On this, Mr. Adams, in his *Essay on the Microscope*, has been very copious; with a view, as he informs us, to remove the common complaint made by Mr. Baker, "that many of those who purchase microscopes are so little acquainted with their general and extensive usefulness, and so much at a loss for objects to examine by them, that after diverting their friends some few times with what they find in the sliders which generally accompany the instrument, or perhaps with two or three common objects, the microscope is laid aside as of little further value; whereas, no instrument has yet appeared in the world capable of affording so constant, various, and satisfactory an entertainment to the mind."

In using the microscope there are three things necessary to be considered. 1. The preparation and adjustment of the instrument itself. 2. The proper quantity of light, and the best method of adapting it to the object. 3. The method of preparing the objects, so that their texture may be properly understood.

With regard to the microscope itself, the first thing necessary to be examined is, whether the glasses be clean or not: if they are not so, they must be wiped with a piece of soft leather, taking care not to soil them afterwards with the fingers; and, in replacing them, care must be taken not to place them in an oblique direction. We must likewise be careful not to let the breath fall upon the glasses, nor to hold that part of the body of the instrument where the glasses are placed with a warm hand; because the moisture thus expelled by the heat from the metal will condense upon the glass, and prevent the object from being distinctly seen. The object should be brought as near the centre of the field of view as possible, for there only will it be exhibited in the greatest perfection. The eye should be moved up and down from the eye-glass of a compound microscope, till the situation is found where the largest field and most distinct view of the object are to be had, but every person ought to adjust the microscope to his own eye, and not depend upon the situation it was placed in by another. A small magnifying power should always be begun with, by which means the observer will best obtain an exact idea of the situation and connection of the whole, and will of consequence be less liable to form any erroneous opinion, when the parts are viewed separately by a lens of greater power. Objects should also be examined first in their most natural position; for, if this be not attended to, we shall be apt to form very erroneous ideas of the structure of the whole, as well as of the connection and use of the parts. A living animal ought to be as little hurt or discomposed as possible. From viewing an object properly we may acquire a knowledge of its nature; but this cannot be done without an extensive knowledge of the subject, much patience and many experiments; as in a great number of cases the images will resemble each other, though derived from very different substances. Mr. Baker, therefore, advises us not to form an opinion too suddenly after viewing a microscopical object; nor to draw our inferences till after repeated experiment and examinations of the objects in many different lights and positions; to pass no judgment upon things extended by force, or contracted by dryness, or in any manner out of a natural state, without making suitable allowances. The true color of objects cannot be properly determined by very great magnifiers; for, as the pores and interstices of an object are enlarged according to the magnifying power of the glasses made use of, the component particles of its substance will appear separated many thousand times further asunder than they do to the naked eye: hence the reflection of the light from these particles will be very different, and exhibit different colors. It is likewise somewhat difficult to observe opaque objects; and as the apertures of the larger magnifiers are but small, they are not proper for the purpose. If an object be so very opaque that no light will pass through it, as much as possible must be thrown upon the upper surface of it. Some consideration is likewise necessary in forming a judgment of the motion of living creatures, or even of fluids, when seen through the microscope; for, as the moving body, and the space wherein it moves, are magnified, the motion will also be increased.

On the management of the light depends, in a great measure, the distinctness of the vision; and as, in order to have this in the greatest perfection, we must adapt the quantity of light to the nature of the object, and the focus of the magnifier, it is therefore necessary to view it in various degrees of light. In some objects it is difficult to distinguish between a prominence and a depression, a shadow and a black stain; or between a reflection of light and whiteness, which is particularly observable in the eye of the libella, and other flies, all of these appearing very different in one position from what they do in another. The brightness of an object likewise depends on the quantity of light, the distinctness of vision, and on regulating the quantity to the object; for one will be in a manner lost in a quantity of light scarcely sufficient to render another visible.

There are various ways in which a strong light may be thrown upon objects, as by means of the sun and a convex lens. For this purpose the microscope is to be placed about three feet from a southern window; then take a deep convex lens, mounted on a semi-circle and stand, so that its position may easily be varied; place this lens between the object and the window, so that it may collect a considerable number of rays, and refract them on the object or the mirror of the microscope. If the light thus collected from the sun be too powerful, it may be lessened by placing a piece of oiled paper, or a piece of glass slightly ground, between the object and lens. Thus a proper degree

of light may be obtained, and diffused equally over the surface of an object, a circumstance which ought to be particularly attended to; for if the light be thrown irregularly upon it, no distinct view can be obtained.

On account of the sun's motion, and the variable state of the atmosphere, solar observations are rendered both tedious and inconvenient, so that it may be advisable for the observer to be furnished with a large tin lantern, formed something like the common magic lantern, capable of containing an argand lamp. There ought to be an aperture in the front of the lantern, which may be moved up and down, and be capable of holding a lens, by which means a pleasant and uniform as well as strong light may easily be obtained. The lamp should likewise move on a rod, so that it may be easily raised or depressed. A weak light is best fitted for viewing many transparent objects, among which we may reckon the preparêd eyes of flies, as well as the animalculæ in fluids. The quantity of light from a lamp or candle may be lessened by removing the microscope to a greater distance from them, or by diminishing the strength of the light which falls upon the objects. This may very conveniently be done by pieces of black paper with circular apertures of different sizes, and placing a larger or smaller one upon the reflecting mirror, as occasion may require. The light of a lamp or candle is generally better for viewing microscopic objects than day-light, it being more easy to modify the former than the latter, and to throw it upon the object with different degrees of intensity.

With regard to the preparation of objects, Swammerdam has, in that respect, excelled almost all other investigators who either preceded or have succeeded him. He was so assiduous and indefatigable, that neither difficulty nor disappointment could make the least impression on him; and he never abandoned the pursuit of any object until he had obtained a satisfactory acquaintance with it. Unfortunately, however, the methods he made use of in preparing his objects for the microscope are now entirely unknown.

For dissecting *small insects*, Swammerdam had a brass table, to which were attached two brass arms, moveable at pleasure. The upper part of each of these vertical arms was constructed in such a manner as to have a slow vertical motion, by which means the operator could readily alter their height. One of these arms was to hold the minute objects, and the other to apply the microscope.

The lenses of Swammerdam's microscopes were of various sizes as well as foci. His observations were always begun with the smallest magnifiers, from which he proceeded by progressive steps to the greatest.

The minute scales or feathers which cover the wings of moths or butterflies afford very beautiful objects for the microscope. Those from one part of the wing frequently differ in shape from such as are taken from other parts; and near the thorax, shoulder, and on the fringes of the wings, we generally meet with hair instead of scales. The whole may be brushed off the wing upon a piece of paper, by means of a camel's hair pencil; after which the hairs can be separated, with the assistance of a common magnifying glass.

Great difficulty is experienced in dissecting properly the proboscis of insects, such as that of the gnat, and the experiment must be repeated a great number of times before the structure and situation of the parts can be thoroughly investigated, as the observer will frequently discover in one what he could not in another. The *collector of the bee*, which forms an exceedingly curious object, ought to be carefully washed in spirit of turpentine, by which means it will be freed from the unctuous matter adhering to it; when dry, it is again to be washed with a camel's hair pencil, to disengage and bring forward the small hairs which form part of its microscopic beauty. The best method of preparing the stings of insects, which are in danger of being broken, from their hardness, is to soak the case and the rest of the apparatus for some time in spirit of wine or turpentine; then lay them on a piece of paper, and with a blunt knife draw out the sting, holding the sheath with the nail of the finger, or any other blunt instrument; but great care is necessary to preserve the feelers, which, when cleaned, add much to the beauty of the object. The *beard* of the lepas antifera is to be soaked in clean soft water, frequently brushing it while wet with a camel's hair pencil; after it is dried, the brushing must be repeated with a dry pencil, to disengage and separate the hairs, which are apt to adhere together.

The eyes of insects in general form very beautiful and curious objects. Those of the libellula and other flies, as well as of the lobster, &c. must be cleaned from the blood, &c. after which they should be soaked in water for some days: one or two skins are then to be separated from the eye, which would be otherwise too opaque and confused; but some care is requisite in this operation, for, if the skin be rendered too thin, it is impossible to form a proper idea of the organization of the part. In some substances, however, the organization is such that by altering the texture of the part, we destroy the objects which we wish to observe. Of this sort are the nerves, tendons, and muscular fibres, many of which are viewed to most advantage when floating in some transparent fluid. Thus very few of the muscular fibres can be discovered when we attempt to view them in the open air, though great numbers may be seen if they be placed in water or oil. By viewing the thread of a ligament in this manner we find it composed of a vast number of smooth round threads lying close together. Elastic objects should be pulled or stretched out while they are under the microscope, that the texture and nature of those parts, the figure of which is altered by being thus extended, may be more fully discovered.

To examine bones by the microscope, they should first be viewed as opaque objects; but afterwards, by procuring thin slices of them, they may be viewed as transparent. The sections should be cut in all directions, and well washed and cleaned; and, in some cases, maceration will be useful, or the bones may be heated to a high temperature, in a clear fire, which will render the bony cells more conspicuous.

EDAM CHEESE.—Alkmaar, in North Holland, is the great market for Edam cheese. It is not uncommon to see 800 farmers at the market, and 470,000 cheeses for sale on one day. The price there averages about 30s. per cwt.

The following extracts are taken from the Edinburgh Quarterly Journal of Agriculture:

GRAIN FROM ODESSA.—Of late years a considerable trade has been carried on with Odessa; but the immense distance will always militate against a very large importation direct from thence. Much business has, however, been done by means of shipping to Malta, Gibraltar, &c. taking out and cooling the cargo, if requisite, and then reshipping it for England. As some may not know the meaning of "cooling," it is necessary to state, that many cargoes have been so heated on the voyage, as to render the pick-axe necessary to get the wheat out of the ship's hold, and in several instances the whole has been thrown overboard by permission of the Board of Customs, or burnt for manure, as it would have endangered the safety of the warehouses from the intense heat which it engenders; for, even spreading out heated corn upon a floor three or four inches thick will not cool it. Independently of the length of voyage from Odessa, there is another circumstance attending the trade there, which forms a considerable impediment to it, namely, that the money must be advanced to the growers before harvest, or they will not send it down to Odessa, the expense being so heavy, and the confidence in that country so little; but I believe the merchant is mostly the sufferer, as the farmers frequently pocket the money, and never send the wheat.

I should mention, that a good deal of wheat is shipped from Odessa to Malta, where it is landed and stored in the *Rock*, and then hermetically sealed, the advantages of which are these, that any worm in the wheat rises to the top and dies; and if the wheat is put into the Rock in good condition, whenever it is removed the condition will be equally sound, and the expense of keeping it is only one per cent. per annum. In case of any demand arising, the wheat is within a reasonable distance, and can be forthwith shipped off, which is of course a great convenience to the owners.

In Russia, Prussia, Germany, Poland, &c. where the estates lie contiguous to rivers, the corn is sent down them in flat-bottomed barks or barges; but the navigation is frequently very dangerous, and at all times precarious. In winter, the rivers are subject to great inundations on the breaking up of the ice; and in summer they are sometimes quite unnavigable for want of water. These causes, preventing supplies from coming to market, occasionally produce a considerable advance in the prices. The river Dnieper has many cataracts and shallows, so that barks can pass for a very short period only in the spring, and those only of a small size. Consequently most of the corn that goes to Odessa is sent in carts, carrying about 5 quarters each. These carts are drawn by oxen, and they travel in parties of 100 to 150. The oxen are pastured during the night, and they take advantage of the time when the peasantry are not occupied with the harvest; so that the proprietors can send their wheat 300 or 400 miles at a very trifling charge. *These districts might be cultivated to almost any extent, should an increased demand for grain arise, and the soil is what is termed "virgin land," requiring no manure whatever.* The wheat is generally dried in the sun at Odessa, before shipment, which is a far preferable mode of drying, in respect to that grain, to kiln-drying; but, as I have before mentioned, even

this will not entirely preserve it from heating, for I never knew a cargo to arrive direct from thence without sustaining more or less injury on the voyage, which is the reason why the Mediterranean ports are made depots for Odessa wheat. From the Baltic ports corn is generally shipped from May 15th to the end of October, and sometimes later.

WHEAT FROM POLAND.—As Danzig, Konigsberg, Elbing, in fact, Poland generally, export more wheat than any other part of the continent, a short statement of how the trade is carried on at these ports may serve as a guide to the foreign trade generally. And, in the first place, it may not be improper to mention the mode of cultivation practised in Volhynia, one of the principal districts for supplying those markets, and from whence the finest wheat comes.

The population consists entirely of slaves, and either the proprietor farms his own estate, or lets it out to what are called "Possessors," at the rate of so much per day's labor, calculated for the peasant; thus the proprietor receives so many days' labor, or rather he receives so much money for each day's labor of the slave. There is a greater number of days' labor imposed on some than others. Suppose there are 1000 slaves on the estate, a calculation is made out of that number how many days' labor they are to perform during the year for the proprietor. A census is then taken of each person and family, which is put into the hands of the "possessor," who exacts so many days' labor from the peasantry, and thus pays so much per day's labor as the rent of his farm to the landlord.

This rotation of crops is followed: 1st, wheat; 2d, wheat and rye; then barley and oats; and after that the ground lies fallow. The capabilities of the soil are most extraordinary; and some idea may be formed of the number of acres under cultivation, when I state, that from Riga alone the following quantities of grain constitute only one year's exportation: Wheat, 200,000 quarters; Rye, 1,350,000 quarters; Barley, 75,000 quarters: Oats, 101,000 quarters; and from 20,000 to 25,000 tons of flax, besides the vast quantity of corn which is eaten by vermin, wasted by exposure in stacks, and destroyed for want of a demand. It is no longer, then, a matter of surprise that corn can be produced at so exceedingly low a rate in Poland, Russia, &c.

It was stated in evidence by John H. Lander, Esq. before the House of Lords in 1827, that wheat had been selling in Volhynia at *7s. and 8s. per quarter!* but that the proprietors of land would be *well satisfied* if they could obtain *12s. per quarter upon their estates!* What do the advocates of free trade say to this? unless, indeed, they wish to drive all our land out of cultivation to benefit the foreigner.

WHEAT OF VOLHYNIA.—As respects quality, the finest wheat in the world is grown in Volhynia, and shipped from Danzig, Elbing, or Konigsberg. The peculiarity of this wheat is the little bran it yields, which makes it much sought after by the English (but more especially by the London) millers. It possesses, likewise, a surprising degree of whiteness, and yields more *farina* than any other sort of wheat, not excepting the finest Essex or Kentish. This superior description is denominated "fine high mixed;" almost all the Danzig wheat coming *mixed*, in proportion to the quantity of *red* wheat, so much lower are the quality and value of the article. The general proportion of ordinary runs is one-third white to two-thirds red. The different denominations are, "finest high mixed;" "good and fine mixed;" "ditto, adapted for Scotland and north of England;" "red mixed," and "ordinary and light;" the first weighing from 61 lb. to 63 lb. per bushel, and the latter from 56 lb. to 57 lb. per bushel. The difference in price varies from 10s. to 15s. per quarter.

WHEAT FROM THE MEDITERRANEAN.—In the Mediterranean, there is some very fine white wheat grown, both "soft" and "hard." A considerable importation took place from Genoa, Naples, &c. a year or two since, which was freely purchased by our millers, at high prices; but this description of grain is particularly used for making *maccaroni* in Italy and France, and is not exported unless a better price can be obtained for it elsewhere, which is not generally the case.

The most inferior wheat comes from Riga. It is extremely small berried, of a dingy red color, and full of little black seeds. There is, however, some of better quality, but the generality is of an inferior description, and the price obtained for it is proportionally low, being 10s. and 15s. per quarter, under the finest Danzig.

GRAIN FROM ARCHANGEL.—In the fall of 1833 a cargo of wheat was bronght from Archangel to Montreal.

The finest heavy Poland and potato oats are grown in East Friesland and Holland. What are termed the "Dutch Brew" oats seldom weigh less than 41 lb. to 42 lb. per bushel, and often much heavier. The Archangel oats are of quite a different description, being extremely thin skinned, sharp, long, and of a bright yellow color. Post and coach masters are very partial to this corn, as it has little husk. Riga and Petersburg oats are somewhat similar, but they do not generally weigh so heavy as the Archangel, neither are they so bright. The cause of this brilliant yellow color is the intense heat of the weather during harvest.

VEGETATIVE PRINCIPLE OF WHEAT DESTROYED.—During the present year, I had a consignment of wheat from Van Dieman's Land, the quality of which was very superior, as may be supposed, when I readily obtained 8s. per bushel for it. I should, however, remark, that a portion of it which was sown on one of the finest farms in Bedfordshire would not grow; and I am informed that scarcely any wheat was ever known to vegetate in this country, that had crossed the line, unless particular care be taken to preserve it from the effects of the atmosphere.

GALWAY.—The population is, we believe, above 40,000; of these a lamentable number is in a state of pauperism. The annals of Galway are carefully preserved from the year 1280, and afford most interesting details. It was once a great depot for Spanish wines.

The Galway females of the peasant class are fond of red petticoats and flannel or frieze jackets. The Wexford ones of blue striped linsey. But there is another much more distinguishing and important mark between them. In Galway, the Irish language is in very general use; so much so that, in many districts, English is hardly understood. In Wexford, Irish is totally unknown.—[Quarterly Journal.]

ANIMAL MANURE.—In Galway, as in Wexford, it is proved, that the application of animal manure, even in the smallest quantities, after marl, or combined with this calcareous earth, produces surprising effects.

DUTCH CLERGYMEN.—Much attention is now paid in Holland to the improvement of the land, the breed of dairy cows, &c. There are the Rotterdam and Haarlem Societies of Arts, the Netherlands' Economical Society, the Society Felix Meritis, the Royal Netherlands' Institution, and the Agricultural Society, all which encourage and promote the knowledge of farming. One of the laws passed during the reign of the present sovereign, obliges each student of divinity to attend a two years' course of lectures on agriculture before being licensed. The great advantage of adopting such a regulation in Scotland must be obvious, where every country minister's glebe might become the experimental fields, or the model for the parish, and he himself, in this respect, the disseminator of every new improvement.—[Trans. Highland Society.]

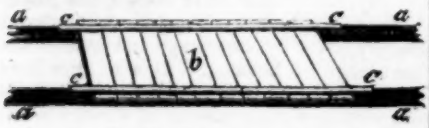
INDIGENOUS ANIMALS.—It has been doubted whether red foxes, mice, rats, the common black fly, the Hessian fly, the honey bee, fleas, moths, bed bugs, and cockroaches, are indigenous to this country.

It appears that the unanimous testimony of the Indians is, that the red fox did not make its appearance until after the Europeans had settled the country, and this was after an extraordinary cold winter, when all the sea to the northward was frozen. Hence it has been inferred that it came over from the north of Europe or Asia on the ice. Another account is that a gentleman of fortune, in New-England, imported a number for the sports of the field, at the first settlement of that country, and that from this stock was propagated the race. It is well understood that our red fox is the same as that of the old world. Kamschatka abounds with them; and when Commodore Bering landed on the western coast of America, he saw several; and Lewis and Clarke also observed them on the west side of the Rocky Mountains. A very severe winter may have driven vast numbers from the regions of the north, into the lower country, about the time mentioned by the Indians, as it frequently has other animals, and particularly squirrels, deer, and bears. Severe cold produces famine, and famine causes the migration of men, as well as of other animals. Little credit is to be reposed in the opinions of savages on such subjects.

Almost all the other animals have probably been imported; but this does not disprove their being also aborigines of America. Fleas have been found on gray squirrels and rabbits, killed in desert parts of the country, where no human creature ever lived; and in new settlements made on pine lands they abound. The cockroach, or blatta orientalis, is said to have been imported from the West Indies; but, on the other hand, it has been found in the midst of woods and deserts. The common mouse and the rat have also been seen, at an early period, in the crevices of stones and subterranean grottoes in remote mountains, where no human being had ever been before. The black rat is probably a native of America, and the gray rat imported from Europe.—[Transactions of the N. Y. Lit. and Phil. Society.]

A New Plan for the Construction of the Wood-Work of Railroads. By ELISHA JOHNSON. To the Editor of the American Railroad Journal, and Advocate of Internal Improvements.

SIR,—Having introduced a new plan for the construction of the wood work of railroads, which is adopted by the directors of the Buffalo and Black Rock Railroad Company, I wish, through your valuable Journal, to give a brief description of the same, in answer to inquiries that have been made.



Place longitudinal sills, *a a*, of round timber one foot in diameter, hewed on one side, even with the surface of the grade; cover the road bed with plank, *b*, two and one-half inches in thickness, and seven feet long, resting upon the grade and sills; over the sills place two by four inch scantling, *c c*, on which are placed the iron plates: all of which parts are secured by eight-inch spikes, terminating in the sills.

The plan is proposed for new districts of country, where the location of the line of road is through low table lands, or the rich farming lands of secondary formation, which are retentive of moisture, or light sand soils; all of which would require expensive preparations of the grade by rubble or gravel blind drains, &c., to prepare for the reception of the timber work.

In the usual form of timber constructions, it has a superficial bearing of twenty-nine feet upon the grade, to the rod. In the above form, there is one hundred fifteen and one-half feet of bearing per rod, increasing the strength of road in proportion to its bearing, on unprepared grades, and ample strength for locomotive power with heavy trains, on alluvial soils.

The expense of materials is about the same in either plan, where suitable timber for rails can be obtained in the vicinity of the line of road.

The improvement proposed consists in saving the expense of a prepared grade and horse path, varying in cost from one to two thousand dollars per mile; also, a saving of the item of suitable rails, when they have to be obtained at great expense of transportation, as well as the mechanical work connected with them.

The plan proposes other advantages, viz.: the admission of the use of such timber as is most convenient to obtain near the line of road; a material saving of expense in passing water-courses, bridges; and the construction of turnouts and crossings by a continuous floor, which forms a roof to the grade; when by use and the effect of rains, the joints of the timber are filled with earth, the water passing off through triangular apertures △, at the meeting at the ends of the supports to the iron; greater security from the effect of frost, by reason of the form of construction and a dry grade; the spike that secures the iron, secures the different parts of the timber work; a dry horse-path, which is proposed to be protected by the use of a thin coating of sand over the floor—this will protect the timber from the effects of the sun, and preserve a more uniform moisture, aiding the preservation of the timber.

In reference to objections that may be urged against proposed improvements, it is not practicable to answer them fully, except by the test of experiment. In the construction and use of such a form of road, it is suggested that it may be inconvenient to repair an imperfect embankment, which is remedied by the ease which the wood work may be taken up and put down again, or by having movable plank at every three or five feet, to be drawn out from between the spike or every other plank moveable, if screwed six inches in width.

The wear of the plank and the effect upon the horse at a speed of ten miles per hour, are proper questions of inquiry. In answer, the wear of the plank: by comparisons made without protection, as proposed, it is satisfactorily ascertained that the wear will be less than the decay for the amount of horse power required on railroads, if locomotive power is not used. The effect upon the horse is believed to be more favorable than upon a compact gravel road in dry weather or frozen earth, ice, or stony roads, if not relieved by the sand covering.

A question may arise, of comparative effect upon the decay of the timber. In the common form, parts of the work, such as the tenants of the cross timber or sleepers, are believed to be in the most exposed situation they can be placed; when in the proposed form, by a continuous bearing upon the grade, the timber can be used in an advanced state of decay.

The simple form of construction removes a prominent cause of expense in the details of the management of laborers and mechanics necessary in completing the several parts in the common form of construction: if connected with the contracts for grading, the sills are put into the grade as a part of the contract. Twelve days, with one superintendant, one mechanic, and six laborers, will complete a mile of road, with the materials delivered on the line, tested by experiments that have been made; the time required is the time necessary to drive the spike.

In adopting the aforesaid principle of transferring the strength of rail to the sill, and obtaining strength of grade by increasing the superficial feet of bearing, will admit of many variations from the above described form, in the size, quality, and quantity of timber, in different descriptions of grade, and in the use of red cedar, with many other particulars not proposed to be entered upon in this communication.

The experiment that has been made in the completion of three-fourths of a mile on the Buffalo road, have been favorable in the results; and in the experiments of loaded cars on the track, a favorable effect was noticed by reason of the continued bearing and direct connection with the grade, particularly on a part of the grade that was loose clean sand, which, from its confined position, had the apparent effect of a stone foundation: the grade receiving all of the action of a moving heavy body.

If these remarks should contribute to useful inquiry, and an improvement made in the form of construction, adapted to the age and circumstances of our country, where capital bears a high rate of interest, and the present limited business of different sections not warranting expensive constructions, would be all that could be expected from these imperfect remarks.

ELISHA JOHNSON, Civil Engineer.

Rochester, Jan. 24, 1834.

COAL STEAM BOILERS.—The construction of steam boilers of such a form as to admit of the use of anthracite coal for fuel, instead of wood, has long been a desideratum. In the engine and apparatus of the steamboat Novelty, it was first designed to use coal, but from some imperfection or obstacle then yet unsurmounted, in the arrangement and adaptation of the furnace and boilers, that design was abandoned.

It is now understood that Dr. Nott has persevered in his experiments for the construction of a boiler and furnace, in which coal may be used to greater advantage than wood, till success has crowned his efforts. But what the form or fashion of his contrivance is for this purpose, we are not informed.

We see it stated in a New-York paper, that a Mr. Disbrow, already favorably known to the public as an ingenious and enterprising mechanic, has likewise succeeded in constructing a "*Lackawana coal boiler*," one of which is in operation on board the steamboat Delaware, and of which an individual who witnessed its operation says, "it accomplishes all the anticipations of the inventor."

MANURES.—We take the following from Sir John Sinclair's Code of Agriculture. Too much cannot be said on this important subject:

Sheep Dung.—This valuable article is collected in several ways. In various parts of the continent, sheep are kept in houses during almost the whole year, for the sake of their manure. When they are fed along the sides of roads, young children are employed to collect the dung they have dropt. Sheep fed on upland pastures are folded in the vale on arable land; and when crops of turnips or of rape are grown, these useful animals are folded upon the crop, which they consume upon the ground, and enrich the soil with their dung. Sheep fed on linseed cake produce an extraordinary fertilizing dung, by which any poor land, whether it be arable or pasture, may be speedily enriched. A most useful plan has recently been adopted, that of folding sheep upon straw in the corner of the turnip field, and carrying the turnips to them. This is particularly suitable for such soils as are too wet or tenacious to have turnips fed upon them; or on sloping grounds, where the manure might be washed down. In regard to folding sheep from upland pastures, on arable land in the vale, no question has been more controverted. It is contended, on the one hand, that the immediate application of dung and urine to all soils, and of treading to loose ones, are so well known, that no doubt can be entertained of the profit of the practice. On the other hand, the profit of such folding is denied, and it is insisted on, that such a system is ruinous to the sheep-pasture, and injurious to the animals. To manure one hundred acres of arable in the vale, two or three hundred acres of pasture are ruined in the hills. The profit of the fold is reckoned only worth about 5*s.* per head per annum, and the animal is injured by the practice, nearly as much, even with little driving. One advantage of folding, however, is, that the wildest sheep are rendered more docile, they feed better and more quickly, during the time they are preparing for market.

Pigeons' Dung certainly possesses much fertilizing power. It readily ferments when moist; but is generally applied in as fresh a state as possible, in gardens, to onions, or to crops of wheat or barley in the fields, sometimes with a mixture of peat, in which case twenty bushels per acre are sufficient. The dung of domestic fowls is likewise carefully collected in the poultry-house or yard: it resembles pigeons' dung in its effects.

But the most valuable article of this sort is the dung of sea-birds that live upon fish. This substance is produced in such quantities upon some small islands in the South Sea, that fifty vessels are annually employed to bring it to fertilize the sterile plains of Peru. It is there called *guano*. If the rains in our climate should injure this manure on the rocks and small isles on our coast, yet it may be found in great perfection in caverns or clefts resorted to by the cormorant and the gull; and in the West India colonies it may be found on rocks, equal to that used in Peru.

Town Dung.—This is an important article, yielding, in many cases, a considerable revenue to the towns, besides fertilizing the neighborhood. In large towns, the quantity to be obtained is enormous, though it is to be lamented that too much of it is thrown away and neglected. In London, it is estimated that the annual produce may amount to 500,000 cart-loads, being only *a part* of the manure collected by sweeping 3000 acres of pavement in streets and market places, and the dung produced by 30,000 horses, 8000 cows, and now, including the environs, nearly a million of inhabitants. The sweepings of streets is a species of manure whose effects are immediate, but not very durable. The dung produced by the cows and horses maintained in towns, if attention be paid to the preparation, is particularly valuable, as the animals by whom it is produced are generally maintained on food of

the richest quality. That of horses being apt to become too dry, ought therefore to be regularly removed, and mixed with other substances.

Night Soil.—This is the richest of all manures, and if dry, the cheapest. It is not only more quick in its operation than any other dressing, but supplies a great abundance of food for plants. Three or four cart-loads are sufficient to dress an acre for the first time, and afterwards, two loads per acre would keep it perpetually in heart. It may be spread with peculiar advantage on grass lands after the hay is cleared away. Its disagreeable smell may be destroyed by mixing it with earth, sweepings of the streets, or quick-lime, or by making it into cakes, with one-third of its weight of rich marl, as practised in China.

Urine.—Every sort of urine contains the essential elements of vegetables in a state of solution. The urine of a horse, being so much lighter, would be more valuable than its dung, if both must be conveyed to any distance. The urine of six cows or horses will enrich a quantity of earth sufficient to top-dress one English acre of grass land; and as it would require four pounds worth of dung to perform the same operation, the urine of a cow or horse is worth about 12s. per annum, allowing 8s. per acre, as the expense of preparing the compost. The urine is much improved by powdered rape-cakes thrown into the cisterns. The advantages of irrigating grass lands with cow urine almost exceeds belief. Mr. Harley, of Glasgow, (who keeps a large dairy in that town,) by using cow urine, cuts some small fields of grass six times, and the average of each cutting is fifteen inches in length. As urine is of a scorching quality, it is unsafe to apply it to growing crops, in great heat or drought. Hence it is unadvisable to use it, except to grass, after the month of April or May, unless diluted. It is particularly useful in spring, when the application of liquid manure gives a new impetus to the plant, and makes its growth more vigorous. This manure forces newly planted cabbages in a most remarkable manner.

Land Animal Substances.—These form a numerous and valuable class of manures. In general, they require to be blended with earthy substances, that a too rapid decomposition may be prevented.

Much useful matter of this description is lost: for instance, if animals who have died of old age or disease were covered with five or six times their bulk of soil, mixed with one part of lime, the earth would, in the space of a few months, be so impregnated with soluble matter, as to be rendered an excellent manure. Besides preventing a nuisance, the putrifying flesh would be more valuable to the farmer than if sold for dog's meat.

Much manure is got from the offals of butchers, and the blood and other substances that might be collected in markets; the graves or refuse of tallow-chandlers, are likewise excellent for turnip crops on the poorest soils. Every attention ought to be paid to the collection of these articles.

Bones, either broken in pieces by a mill, or the refuse turnings and dust of bone and horn manufactures, are used with much advantage as manures, and are peculiarly calculated for limestone land. Sixty bushels are applied per acre, which in Yorkshire costs from 18d. to 20d. each. They are sometimes mixed with earth in a compost; but are most successfully applied when crushed in a bone mill. They are an excellent dressing for meadows or pastures, but for arable land, are not thought by some superior to lime or dung.

Every species of animal offal or refuse will act as a manure: as, 1. *Woollen Rags*, chopped in small pieces, from 5 cwt. to 12 cwt. to be used per acre; they are best for dry and sandy soils, as they attract moisture from the atmosphere and retain it. 2. *Currier's shavings* and *furrier's clippings*, which are likewise calculated for dry soils; the quantity required is about thirty bushels per acre. 3. *Horn shavings*, equally applicable to all soils, thirty bushels of which are sufficient per acre. 4. The *scrapings of sheep's trotters, calves' feet, &c., hog's hair, feathers*; in short, all sorts of animal substances should be collected, and in proportion to their bulk, they will increase the fertility of the soil.

Fish.—Along such an extent of coast as Great Britain and Ireland possess, much advantage might certainly be derived from fish as a manure. In the fens of Lincolnshire, Cambridgeshire, and Norfolk, the small fish called sticklebacks, periodically swarm in the rivers to such a degree, that they may be purchased at from 6d. to 8d. per bushel, and applied in forming composts. Herrings, sprats, and the fish called sea-dogs, are managed in the same way. The refuse of the pilchard fishery in Cornwall never fails to give great crops, wherever it is spread. Whale-blubber offal, also, is every where applied to this use, and with the greatest success. Such manures minutely divide the particles of the soil; and are peculiarly beneficial to newly broken up barren soils.

Report of Live Hedges.—The "Massachusetts Society for the Promotion of Agriculture," in the view it was their duty to take of those objects to which public attention might be beneficially invited, have thought that, in the progress of the culture and improvement of the country, Live Hedges would, in many places, become highly important and even necessary, where stone is not to be had, and timber, as must soon be the case, shall become more valuable for other uses. The beauty, permanency, and efficacy of this mode of enclosure is, with foreigners and many of our own countrymen, becoming a subject of taste and admiration. It is not our intention to deny the efficacy or expediency, in most places, at present, of a good rail fence, or, what is better, a strong stone wall. But, as our divisions of land multiply, these materials, in many places, will become more scarce and difficult to be had. As this shall occur, the introduction of live hedges will come into use here, as they prevail elsewhere. A gradual introduction of them must be useful, and add a verdure and beauty to the face of the country as its cultivation increases. Under this impression, the trustees of the Massachusetts Society were induced to offer a premium of $30 for the best hedge, not less than 100 rods, which shall be in the most thriving state in 1833.

On this subject the committee on live hedges have a pleasure in presenting to the public the following communication of E. Hersy Derby, Esq. It will be seen that he has, by well-tried experiment, established the perfect adaptation of the Buckthorn (or Rhamnus Catharticus) to our climate, as well as its preference over several other plants.

They therefore unanimously award to E. Hersy Derby, Esq. the premium proposed of $30, for his hedge, of upwards of 100 rods, and recommend that his detailed and useful communication on this subject be printed.

By order of the Committee,
John Welles, Chairman.

Salem, Nov. 30, 1833.

The Committee on Trees and Live Hedges.

Gentlemen,—Please consider me an applicant for the premium offered by the Society for the best buckthorn hedge, not less than 100 rods, which shall be in the most thriving state in 1833. On measuring mine, I find I have over 118 rods of the buckthorn hedge, which I have reason to think would be considered at least equal to any in this country.

The trustees generally have examined the state of it the present season. Should it be thought proper, I will make a few observations on my experiments in hedging.

I have been for a great many years fully convinced of the superiority of live hedges for efficacy and economy. I began by setting out my first hedge about thirty years since, of the English hawthorn; the result was far from satisfactory; the plant, being not adapted to our climate, is injured by our summer droughts; frequently experiences blight early in August, and, by the first of September, assumes a wintry appearance. My next experiment was with the three-thorned acacia: to this hedge I devoted the most careful attention; but the result was equally unsuccessful. The plants run up without interlacing, and the thorns growing only upon the upper branches, the stems below were not thick enough to serve as a fence; it was beside too tender a plant to bear our severe winters. I also tried the crab-apple with but little better success. About 1808, there was standing in the garden of the venerable Dr. Holyoke, of this town, which adjoined that of my brother, a large tree of the buckthorn or rhamnus catharticus. In digging the latter, the gardener found several young plants, which had grown from seed shed by this tree. They were given to me and set out in a nursery; finding they grew very rapidly, I was induced to set them out for a hedge some time in 1809, and in this attempt I was entirely successful. The length of this hedge is about 20 rods; has been a good fence over 20 years, and is, at the present time, in a fine, healthy state, not a single plant having failed since it was first set out. It presents a mass of verdure from early spring until late in the autumn, and is completely impervious, affording entire protection to the land it incloses. It being my first experiment with the plant, I did not head it down so low when young as I have since found it advisable to do; the consequence is, that it is not so thick at bottom as any of my others set out since. Finding it so hardy a plant, and so well adapted for hedges in our climate, I have been induced to cultivate it very extensively, and have, at different periods, extended my hedges until they measure nearly 120 rods in length.

The method I should recommend in setting a hedge, would be to place the plants in a single row, about 9 inches apart, either in the spring or fall of the year; if in the fall, I should clip it the next spring, within six inches of the ground, which will cause it to be quite thick from the bottom; any after-pruning can be made to suit the pleasure of the cultivator. I have also tried plashing; it was recommended to me in 1818 or '19, by my gardener (an Englishman), and I allowed him to try it upon a young hedge of crab-apple; but the hedge never flourished afterwards, and I, at last, pruned away the branches he had interwoven, and lost four years' growth by the experiment. I have never found plashing necessary for the strength or beauty of the buckthorn hedge, the natural growth of the branches being sufficiently interlaced. Three years' careful management in the way I have described is sufficient to form a perfect hedge, nearly as thick below as above. I am, gentlemen, very respectfully, yours, &c.

E. Hersy Derby.

Importation of English Cattle.—At a meeting of the Ohio Company for the importation of English Cattle, held at Madeira's Hotel, in Chilicothe, on the 27th ult. it was resolved that Mr. Felix Renick, of Ross County, a successful dealer in Stock, and an excellent judge of cattle, be appointed agent of the company, to proceed to England, with as little delay as possible, for the purpose of selecting and purchasing a stock of the finest cattle to be met with in that country.

We cannot help expressing our best wishes for the success of so spirited an undertaking. In Ohio, a country abounding with the finest grasses, there is every advantage for improving the breed of stock, which forms so important a part of the export produce of the State.—[Nat. Intell.]

Sugar in Soups.—A London paper says, "Sugar is now becoming a universal ingredient in many of our soups in ordinary use, such as soup crisis, gravy soup, &c., being found to add greatly to their flavor and wholesomeness."

RURAL EMBELLISHMENTS AT LITERARY INSTITUTIONS—*Visit to a Farm-House.*—It may be stated as a partial apology for the literary institutions criticised in the following beautifully written article in the Genesee Farmer, that the sole object of the students who labored on the farm and in the garden of the Oneida Institute, was to obtain money to defray their expenses. In this they have been very successful. When a student, whose leading desire is to make rapid progress in his studies, enters the field or garden, he seeks that employment which affords him the most healthy exercise in a limited time. Field and vegetable crops, independent of the profit, afford this more directly than flowers and ornamental gardening. Still, taking into view *all* the objects that are to be accomplished at our higher seminaries, the strictures of the writer are just in every respect. As for Hamilton, we now, since its affairs are prosperous, hope for better things.

Oneida Institute.—It is not from a desire to find fault, so much as from a wish to provoke reform, that I mention my great surprise, on a late visit to this school, at the want of rural taste and embellishment in its grounds. I expected that the manual labor, which forms a part of its exercises, would afford practical instructions in the best models of farming and gardening; and that the ornamental branches of the latter, which every gentleman *intends* to cultivate, and which is no less instructing than captivating to youth, and the presence of which affords the strongest evidence of comfort, contentment and social refinement, would form a prominent feature in the grounds. I had anticipated a display of rural taste and beauty, under the direction of an experienced gardener and botanist; and at least, to see a beginning made to collect about the buildings, the majestic trees and humble shrubs of our forests, as well as rare and ornamental exotics. I expected no less to find a garden well stocked with choice fruits, and all the rare and useful vegetables, and their culture and propagation forming a branch of instruction. And as I am one of those who believe, that even floral beauties were not designed only to "waste their fragrance on the desert air," but that they are intended to delight the senses, refine the heart, and awaken the admiration and gratitude of man towards his Creator—to behold a brilliant display of these was among the pleasures I anticipated from the visit to a school of manual labor, whose inmates are designed to produce a benign influence by their precepts and their practice, upon the habits and happiness of society.

These expectations had probably been somewhat heightened by having read, recently, of the law which exists in some of the German States, particularly in Bavaria and Wurtemburg, which attaches to every school a garden, and makes a knowledge of horticulture a necessary qualification in a teacher. The labors of the garden afford a recreation to the pupils in the hours of intermission, and are eminently calculated to blend usefulness and pleasure, and to win the young mind to the love of knowledge and virtue. Memory, too, brought to my mind, at the time, what I had heard of the order, neatness and rural beauty displayed about the manual labor schools of Fellenburgh and Pestalozzi. I rode more than sixty miles, said Professor M'Clure, (and I think I had the relation from his mouth,) when travelling in Germany, on purpose to see the practical effects, in mature life, of Pestalozzi's system. Those whom he visited, and were settled in life, had been principally reclaimed from pauperism and vice, by this eminent philanthropist, and educated and taught some useful branch of labor, under his eye and from his bounty. Botany, geology and practical gardening, formed indispensable branches of study. The Professor found these pupils of Pestalozzi, without exception, patterns of industry and sobriety, possessing the esteem of all around them, and diffusing a salutary influence upon society. Each was possessed of a small cabinet of minerals, collected by himself, a select library, and a garden, stored with the choicest vegetables, fruits and flowers. Some of these gardens, says the Professor, vied in taste and beauty with many of the celebrated gardens about Paris. The cabinet, the library and the garden, afforded useful and delightful employments for all the hours that could be spared from labor, and left no void for ennui or gossip.

With a mind under the influence of these recollections, you may judge, Mr. Editor, of my surprise, on reaching the beautiful site of the Oneida Institute, and finding it destitute of almost every artificial grace and decoration with which my imagination had clothed it. Scarcely a tree planted that reflected credit upon either planter or nurse; not an ornamental shrub met my eye, nor a cultivated flower, save a few inferior varieties, which I suspect were planted by the good housekeeper, near the wall of one of the edifices; but the whole lawn abounded in weeds and apparently ill cultivated farm crops. The garden displayed more industry, but very little more taste. Onions, cabbages, the Swedish turnip and mangel wurtzel, all good crops in their place, but not all adapted to garden culture, occupied the principal quarters. But we saw no fruit trees, no shrubs, nothing ornamental, useful or rare, which a gardener or amateur would take pride in showing to a friend or stranger. It exhibited the appearance of a tolerably decent market garden, and nothing more.

My travelling companion was so sadly chagrined at the bad appearance of the court and garden, that he could not be prevailed upon to accompany me to the school and farm; and we resolved to seek a solace for our disappointment, in examining the grounds of

Hamilton College—which being an older institution, we expected to find in better keeping. We arrived at the summit of Clinton-hill during vacation. An open door in one of the college buildings admitted us into a hall, from which we found an unobstructed passage to the top of the building. It was a fine day. The prospect was extensive and highly interesting. At the foot of the hill, one and a half miles distant, the neat village of Clinton showed to advantage. The intermediate slope was finely chequered with orchards, gardens and fields, redolent with the tributes of Flora and Pomona, covered with growing corn, or spotted with flocks and herds. A luxuriant landscape presented before us, for miles, exhibiting the varied beauties of husbandry, and the indications of industry and wealth—with the valley of the Mohawk, the spires of Utica, and the more distant highlands in the back ground. But when we circumscribed our view to what we considered *classic* grounds, how mortifying was the contrast. *Yonder* art and industry had done much to improve the scenery of nature; *here*, they had done little but to mar it. The grounds comprise a parallelogram of some fifteen or twenty acres, in which the college buildings are situate. They have been enclosed by a fence, but it seems to be in a state of dilapidation. Trees *have* been planted; but I believe every one has been broken or is dead. Not a living tree or shrub, not a cultivated plant, save a patch of starved potatoes, could be seen within this spot, consecrated to literature and science! Old timbers, stone and rubbish, were the prominent objects that arrested the eye. On our descending we observed on the outer door, as if recently cut with a penknife—"*Only three weeks more!*" "Poor little fellow," exclaimed my friend, "no wonder you sighed for home, and counted the tedious weeks which confined you to a place where there is so little to interest the best feelings of your nature. God has bountifully scattered over creation a multiplicity of natural objects, to beguile the tedium of study and labor—and to inspire us with kindness and piety; yet, from *this* spot, where they ought most to abound, they seem to have been expelled—totally expelled—by the ruthless hand of man—by the phrenzied hand, I fear, of unrelenting religious strife!"

We were not a little compensated for our disappointment at the schools, by unexpectedly finding, upon a by-road, and upon the demesne of a humble, unobtrusive farmer, one of the prettiest displays of horticultural taste and rural embellishment that I have witnessed. But as my companion is a horticulturist, and somewhat of an enthusiast in the flower garden, I shall leave to him the pleasure of describing this sequestered but enchanting spot. B.

[We subjoin the article referred to.]

The only apology I have to offer for tardiness in discharging the agreeable duty imposed by my friend and fellow-visitor to the Oneida Institute, &c., is my diffidence of succeeding with any degree of merit, in a field where he is so perfectly at home. I allude to "Sketches of a Jaunt in Oneida County," published in the Genesee Farmer of September 28. So much, however, was I struck with the order and beauty which reigned in and around the comprehensive establishment of Mr. Benjamin Newhouse, of Whitestown, that my imagination and memory are, even at this late date, fraught with the idea, and I shall attempt to redeem my pledge.

Our disappointment at the unpromising state of the Oneida Institute, and of Clinton College, had left our minds in a proper frame for the agreeable surprise which awaited us; but however fine the remark that every thing is good or beautiful by contrast, it was not on this principle alone that we were now gratified, for the seventeen acre farm of Mr. N. comprehended so much of the intrinsically valuable, useful, and beautiful, that it was impossible to withhold from *it* our admiration, and from its *proprietor* our good opinion and good wishes. Such examples of well applied industry are unfortunately too rare, and I most sincerely hope that Mr. N.'s adopted country, (he being a native of England,) will afford him all reasonable countenance, encouragement, and support; not only as his desert, but that it may awaken in others a laudable ambition.

On the road from Clinton, our attention was attracted by some fine-looking fruit in a small orchard, and I proposed to my friend that we should alight and take a closer survey. The proposal, and its execution, were simultaneous; and in a few seconds we found ourselves on a velvet turf, beneath some of the finest apple trees I have ever seen. Every thing here was in keeping; the trees finely formed, the bark smooth, sound, and bronze-like; the fruit of the choicest varieties; all in the best order,—the little spot, on which they grew, free from suckers or any thing which could impede their growth. I apologized for leaving my friend a short time, and proceeded to the house for the purpose of obtaining permission to gather a few apples, *to exhibit* as specimens of the successful culture of that fruit.

The gate which admitted me into the modest court swung easily on its hinges, no broken bar, no dilapidated latch delayed my entrance, for all was orderly, convenient, and simple. As I approached the house, the cloud of ill humor which had begun to break in the orchard was entirely dissipated by the bright array of dairy utensils, which, on a well-scoured stand, glistened in the cheerful sunshine. With those pure and cleanly trays were associated luxurious ideas of cream cheese, almond butter, and every imaginable modification of milk.

On entering, I found the frugal mistress of the lowly mansion assiduously ironing a quantity of coarse garments, such as are required by the practical agriculturist, but to which her industrious hand had given an appearance of finish and almost refinement.

Mrs. N. yielded a ready accordance to my request, and at the same time gave free permission for myself and companion to visit her garden, which I had noticed when approaching the

house. We entered it together, and here, indeed, we found a feast spread which must have pleased even a cynic. Persevering industry and taste had "made the wilderness to rejoice and blossom as the rose."

When you enter the gardens of the great, you expect to find in them the contributions from all the zones and artificial climates suited to their different constitutions; but, on opening the wicket of a cottage garden, a few plebeian vegetables, a few fragrant herbs, a few clumps of pinks, and a rose bush, are, in general, all that meet the eye. Not so Mr. N.'s well chosen, well protected corner, which, almost triangular in its form, was sheltered on one side by a pretty piece of woods, and on another by the orchard on a rising ground, leaving the front most judiciously open to a fine south-eastern exposure.

After bestowing the due meed of approval on the choice of its position, its stock and arrangement next attracted our pleased attention. Imagine, then, our surprise at finding, in a sweet and pleasant nook, a rural green-house, filled with the choicest gems of Flora, and in front of the green-house, and along the borders, were noticed many of the finest exotics in clean jars. Indeed, so well and comfortable were these strangers accommodated, that they had all the satisfied, domestic, and healthy appearance of native citizens—further on, our beautiful native flora in great variety and splendor. After indulging our taste at the expense of time—which so spent, passed unconsciously—we continued our course round the garden, gratified at every step by the sight of thrifty patrician as well as plebeian vegetables, until appetite was created by this goodly show of pulse and succulents.

The borders, too, wanted not their appropriate ornaments; the grape found its favorite position, and every thing was here, necessary to a thoroughly well furnished fruit, flower, and kitchen garden.

We left this prolific green spot regretting the absence of its master, and hoping to succeed in giving some little celebrity to an example so worthy of imitation. A. W.

Elm Place, Lansingburgh, Nov. 30, 1833.

A New Mode of Rearing Asparagus.—The asparagus seed should be sown from the middle of March to the last of April, in a rich spot, (not too much exposed to the midday sun,) one inch deep, and the seed one inch apart; after they come up, to be kept clear of grass and weeds during the summer, by hand weeding; to be dug up the next fall or spring—(I prefer the spring, as the roots do not grow during the winter, if set out in the fall, and are liable to be killed by a severe winter,) and set in beds prepared as follows: Dig out the size of the beds nine inches deep—cover the bottom three inches deep with rich marl, (which has been my practice,) though I believe that oyster shells half burned will be as good, as it is intended as a lasting heating manure, to protect the roots in winter, and force the vegetable early in the spring: then put three inches deep of coarse stable manure, then three inches of rich earth. This brings the beds on a level with the surface of the earth. Next lay off the beds in rows eighteen by twelve inches apart, and put a single eye or spire in each spot where the lines intersect, and cover them three inches deep with rich earth. Plank the sides of the beds, as this prevents grass and other roots from running into the beds, and also keeps the outside roots from being exposed, by the sides of the beds washing away. The beds should be kept clean by hand weeding, and all the earth and manure used in making them should be perfectly free from grass roots and noxious weeds. In the fall of the year, after the seeds have matured, cut the tops off close to the beds, (being careful that not a single seed is left to vegetate on the beds,) as they have already as many roots as the space they occupy should contain, and if additional roots are suffered to form from year to year from the falling of the seed every fall, the beds will soon be so much clustered with roots that the vegetable must degenerate, at least in size and length, as the new roots form near, or on the surface. Some prevent this by burning, but I think the best way is to pick them off by hand, before the ball that contains the seed breaks. You then top dress the beds with coarse stable manure, let it lie on all winter, and in the following spring rake off the coarsest part, and fork in the remainder, being careful that the fork does not touch the roots. Pursue this course two falls, and early in the third spring, before the bbes are forked up, put on two inches of light well rotted manure—fork it with the stable manure, then put on from three to four inches deep of clean sand from the river shore, and you will cut in the month of April the best vegetable we have in Virginia. I would not give my beds for the balance of my garden. I think there is much in the kind of seed. I obtain my seed from New-York; they were marked "giant asparagus."

The cover of sand is important on several accounts; its being a great absorber of heat and moisture, so soon as the vegetable gets through the soil, it is hastily thrown through the sand to the surface in a bleached tender state, and the cutting from day to day is more uniformly of the same tender delicious vegetable. The sand also prevents grass from growing on the beds, which obviates the necessity of so much hand weeding during the season for cutting, by which the beds frequently become trampled, and the vegetable that is about to come through the surface mashed down, which not only destroys the spires that are so trampled on by the gardener in the process of hand weeding, but (I think) injures the root. The sand should be laid in the alleys between the beds, in the fall, when the beds are about to receive the top dressing of stable litter to keep them warm through the winter; and when the sand is about to be replaced in the spring, it should be passed through a sieve of such size as will not let the balls (that contain the seed) pass through. This will be another means of preventing the seed from vegetating on the beds. There is a practice very prevalent with gardeners, to plant lettuce, radishes, and other early vegetables on the beds; this should never be done, and particularly with radishes, as they have a long root that extends to the roots of the asparagus, and must seriously interfere with them.

I frequently cut asparagus from three to five and a half, and once I cut a spire six inches in circumference, and from five to eight inches long; it could have been cut longer, but it is never tender near the root.—[Farmer's Reg.]

Wool Market in Germany.—The extraordinary activity in the German wool markets renders an account of them interesting. The price has started from 30 to 40 per cent. above last year. There is no wool left in the hands of the farmers, and even the quantity in the hands of the dealers is much smaller than at any former period. The following extract of a letter from Leipsic, from a person who seems to be well acquainted with the state of the German woollen manufactures, shows an activity among the German manufacturers, which the woollen manufacturers in this country would do well to consider. "The consumption of wool," says he, "in Germany and the Netherlands, has increased amazingly, and we safely say, that at the very utmost, only one-fourth of the wool produced in Germany is exported to England. The German manufacturers go on very briskly, the number of looms increases daily, and if they continue to proceed so for a few years, they will be able to consume the whole produce of German wool, without being obliged to have recourse to the English market. The manufacture of woollen yarn has been quite neglected, but within the last few years it has been very much cultivated, and has made such a rapid progress, that there are now worsted yarn spinners in Germany, who consume 30,000 to 40,000 cwts. a year: combing wool is therefore very much looked after, and there will be a deficiency in the quantity imported into England. Things have changed now, and instead, as in former times, the English being the rulers at the German wool fairs, the German and Belgian manufacturers are predominant, and pick the flower of the wool, as they are able to afford higher prices than English buyers."—[Quarterly Journal of Agriculture, Dec. 1833.]

Love of Music by Sheep.—We were surrounded by a large flock of sheep which were leaving their fold to go to pasture; one of our party took his flute out of his pocket, and saying, "I am going to turn Corydon, let us see whether the sheep will recognize their pastor," began to play. The sheep and goats, which were following each other towards the mountain with their heads hanging down, raised them at the first sounds of the flute; and all, with a general and hasty movement, turned to the side from whence the agreeable noise proceeded. Gradually they flocked round the musician, and listened with motionless attention. He ceased playing; still the sheep did not stir. The shepherd with his staff obliged those nearest to him to move on. They obeyed; but no sooner did the fluter begin again to play, than his innocent auditors returned to him. The shepherd, out of patience, pelted them with clods of earth, but not one of them would move. The fluter played with additional skill; the shepherd exasperated, whistled, swore, and pelted the fleecy amateurs with stones. Such as were hit by them began to march, but others still refused to stir. At last the shepherd was obliged to entreat our Orpheus to cease his magical sounds. The sheep then moved off, but continued to stop at a distance as often as our friend resumed his instrument.—[Vic de Haydn par Bombat.]

Hints to Housewives.—Silk, or any thing that has silk in it, should be washed in water almost cold. Hot water turns it yellow. It may be washed in suds made of nice white soap; but no soap should be put upon it. Likewise avoid the use of hot irons in smoothing silk. Either rub the articles dry with a soft cloth, or put them between two towels, and press them with weights.

Do not let knives be dropped into hot dish-water. It is a good plan to have a large tin pot to wash them in, just high enough to wash the blades, without wetting the handles. Keep your castors covered with blotting paper and green flannel. Keep your salt-spoons out of the salt, and clean them often.

Do not wrap knives and forks in woollens. Wrap them in good strong paper. Steel is injured by lying in woollens.

Do not let coffee and tea stand in tin. Scald your wooden ware often; and keep your tin ware dry.

Barley straw is the best for beds; dry corn husks, split into shreds, are far better than straw.

Straw beds are much better for being boxed at the sides, in the same manner upholsterers prepare ticks for feathers.

Brass andirons should be cleaned, done up in papers, and put in a dry place, during the summer season.

If you have a large family, it is well to keep white rags separate from colored ones, and cotton separate from woollen; they bring a higher price. Paper brings a cent a pound, and if you have plenty of room, it is well to save it. "A penny saved is a penny got."

Never allow ashes to be taken up in wood or put into wood. Always have your tinder-box and lantern ready for use, in case of sudden alarm. Have important papers all together, where you can lay your hand on them at once in case of fire.

Keep an old blanket and sheet on purpose for ironing, and on no account suffer any other to be used. Have plenty of holders always made, that your towels may not be burned out in such service.—[Frugal Housew.]

DUTCHESS COUNTY FARMS still continue to sell at good round prices. Mr. Thomas M. Vail sold his farm a few days since, consisting of 352 acres, and situate in the town of La Grange, about 11 miles from this village, for *sixty-seven* dollars the acre. He bought it about seven years since for thirty-five dollars the acre. He has therefore realized a profit, from the advanced price, of rising *ten thousand dollars*.

Two farms belonging to the estate of the late William R. Van Voorhis, in the town of Fishkill, about one mile from the flourishing village of Fishkill, recently sold, the one of 175 acres, for $70 the acre; the other of 120 acres, for $65 the acre. We are informed that an advance of $2000 has been offered the purchaser.

Mr. Garret Brinckerhoff, a few days since, sold 60 or 70 acres from his farm, lying three miles north of Fishkill landing, for *one hundred and twenty* dollars the acre. This land was entirely without buildings of any kind.—[Poughkeepsie Journal.]

A METHOD OF REARING EARLY PEAS AND OTHER VEGETABLES.—An English gardener states that "the method of rearing peas in pots and boxes, in hot-beds and hot-houses, and afterwards transplanting them out into open ground, is a common practice with gardeners, and often succeeds very well, particularly if they are not too long in transplanting them; but I would recommend a method not so well known, as far preferable to that of pots and boxes, particularly when they are to be raised in a hot bed. This consists in having a quantity of turf cut in pieces, of about nine or ten inches long, and three or four broad, which are placed in a regular manner over the surface of the hot-bed, grass side downwards, and a row of peas is sown upon each row of turf, and afterwards covered with soil; when they are fit for transplanting, no more is required than to lift out the turf, piece by piece, with the peas growing upon it, and place them where they are to produce their crop. By this means the roots receive no injury, nor do the plants sustain the least check in transplanting. This method may be practised with similar success in the raising of potatoes, beans, &c."

Ornamental Trees. By A. J. DOWNING.

[From the New-England Farmer.]

It is remarkable that notwithstanding the rapid progress which Horticulture is making in the United States, so little attention is paid to the planting ornamental trees, with a view to the embellishment of our country residences. The magnificent parks of England have been long and justly admired, as constituting one of the most beautiful features of that highly cultivated country; and although the horticultural creations of our more limited means may never equal in extent and grandeur some of those of the aristocracy of Europe, yet every person of cultivated mind is aware how beautiful the hand of taste can render even very limited scenes, by the proper application of the principles and materials necessary to mental pleasure and gratification.

Considered in a single point of view, what an infinite variety of beauty there is in a tree itself! Every part is admirable, from the individual beauty of its leaves, to its grand effect as a whole. Who has not witnessed in some favorite landscape, the indescribable charm thrown over the whole scene by a single tree? Perhaps a huge giant, whose massy trunk and wide out-stretched arms have been the production of ages; or the more graceful form of another, whose delicate foliage reflects the sunbeam, and trembles with the slightest breeze that passes over it. There is no monotony in nature—even in trees, every season has its own charms. Spring, the season of renewed life, witnesses the rush of the newly imbibed sap—the buds swell—the tender leaves unfold, and the admirer of nature is delighted by the freshness and vividness of the young foliage. Summer comes—he is refreshed by the fragrance of their blossoms—their shade is a welcome luxury in the noontide sun—perchance their fruit may be an acceptable offering to the palate, and who in this country has not witnessed the autumnal glories of an American forest?

There is no country of the globe which produces a greater variety of fine forest trees, whether considered for the purposes of ornament or timber, than North America. Yet it is a fact, that for both these purposes, more particularly the first, they are horticulturally better known in many parts of Europe than they are now at home. Those governments have imported the seeds of all our most valuable forest trees, annually, for more than a century. Instead of planting, our agriculturists have been hitherto engaged in destroying. In the Atlantic States, this period is now past; and we would, therefore, first direct the attention of the arboriculturist to our own trees.

There is not, in the whole catalogue, scarcely a more interesting object than an immense oak tree, when placed so as to be considered in relation to the large mansion of a wealthy proprietor. Its broad ample limbs and aged form give a very impressive air of dignity to the whole scene. It is a very common inhabitant of our woods, there being 44 species of indigenous growth between the 20th and 48th degrees of north latitude.* The pendulous branches of the American elm—the light foliage of the birch—the cheerful vernal appearance of some of the species of maple—the delicate leaf of the locust—and the heavy masses of verdure produced by the beech,—are sufficient to render them all ornamental in Park scenery, and they should ever find a proper situation in an extensive lawn. Our American poplars should be recollected when a rapid growth and immediate effect is required. *Gleditschia triacanthos*, or the sweet locust, is interesting from its long masses of thorns. One of our most ornamental trees, both in foliage and flower, is the white wood, *Liriodendron tulipifera*. Its erect, tall form, large yellow blossoms, and handsome leaves, have rendered it an universal favorite in Europe, and there can scarcely be a more stately object to stand as an isolated specimen. The plane or sycamore (*Platanus occidentalis*) is too much neglected, because it is so common; but in favorable situations, in deep soils, and where ample room is afforded, it produces a noble tree of immense size. Several have been measured on the banks of the Ohio from 40 to 50 feet in circumference.

A native tree, but little known in our ornamental plantations, is the Kentucky coffee, *Gymnocladus canadensis*. It is a native of Kentucky and Tennessee, grows to the height of 40 feet, and its doubly compound foliage, and very singular appearance when defoliated in the winter months, are well calculated to render it an interesting feature in the landscape. *Cupressus disticha* (*Taxodium* Richd), the deciduous Cypress, flourishing in vast quantities in the southern parts of the Union, is, though perfectly hardy and of easy cultivation, but little known in the Northern States.* Its beautiful light green foliage contrasts elegantly with the denser hue of other deciduous trees, and we are hardly aware of an upright growing tree better calculated to give variety of color to groups and masses, than this. *Catalpa syringafolia* is a most striking ornament to a lawn, when in the summer months it is loaded with its large clusters of parti-colored flowers.

But the most splendid, most fragrant, and most celebrated ornamental production of the woods and forests of our country is yet to be mentioned. It is the unrivalled *Magnolia grandiflora*, the most magnificent of the genus, a beautiful tree of 70 feet in its native soil, only attains the size of a large shrub in the Middle States, and will scarcely withstand the winters of the Northern. But *M. acuminata*, though not so beautiful, is a fine large tree, sometimes attaining the height of 90 feet. It is abundant in Western New-York and Ohio. *M. macrophylla* is not only remarkable for the beauty of its flowers, but also for the extraordinary size of its leaves; they having been measured so long as 3 feet. *Magnolia tripetala*, the umbrella tree, is also a fine species growing in districts from Georgia to New York: its large cream-colored flowers measure seven or eight inches in diameter. Still more rare, though highly ornamental, are *M. cordata* and *M. auriculata*; small trees which ought to be indispensable to every collection. The species of smallest stature and most frequent occurrence in the Middle States is *M. glauca*, the flowers of which are highly odoriferous. It succeeds best in damp soils, and is found very plentifully in situations of this kind in New-Jersey.

Ornamental trees from other countries should find a prominent place in the plantations of our horticulturists. They not only have an intrinsic value in themselves, but to a refined taste they offer gratifications from the associations connected with them. Thus the proprietor may view, in the walks over his grounds, not only productions of his own country, but their fellows from other climes. We may witness flourishing upon the same soil, many of the productions of southern Europe and Asia; individuals from the frigid regions of Siberia, and the almost unknown forests of Patagonia; vegetables which perseverance has abstracted from the jealous Chinese, and which the botanical traveller has discovered among the haunts of the savage Indian.

Among the foreign trees which are most generally cultivated for ornament in this country, we may mention the two genera of *Tilia* and *Æsculus*. The European Lime or Linden tree, with its fine stately form and fragrant blossoms, is a most pleasing object as an ornamental tree. The horse chesnut (*Æ. Hippocastanum*) is perhaps better known than any foreign tree in the country; its compact growth, fine digitate leaves, and above all, its superb, showy flowers, distributed in huge boquets over the foliage, have rendered it here, as in Europe, an object of universal admiration. We would here beg leave to direct the attention of planters to the less known, but not less interesting species of this tree, natives of our own soil. *Æsculus paira* producing red, and *Æ. flava*, yellow flowers, form very beautiful trees of moderate size. The other species are rather large shrubs

* Michaux.

* We have seen a celebrated specimen in Col. Carr's garden, Philadelphia, 180 feet high, 25 in circumference, and 91 years old.

than trees, and are very pretty ornaments to the garden.

The brilliant appearance of the European Mountain Ash (*Sorbus aucuparia*), when in autumn it is densely clad with its rich crimson fruit, is a circumstance sufficient to give it strong claims to the care of the arboriculturist, independently of the beauty of its foliage. But a tree, which from this latter property has long been a favorite with us, and which, though it is common in Europe, we regret to say is yet but half so well known as it should be, is the silver leaved Abele, *Populus alba*. Its growth is very rapid, and it is, therefore, well adapted for planting where time is an object of consideration. The flowers are insignificant, but its leaves are highly interesting. The under side of each of these is rendered perfectly white by a dense cottony pubescence, and in a gentle breeze, from their being supported on slender petioles, they are in constant motion. At a modera te distance, to a spectator standing on the windward side, they give it frequently the appearance of being covered with a profusion of white flowers. It has a beautiful effect from the house when seen at some distance in the foreground of a handsome group of trees of a darker green. Added to this, it holds its foliage unscathed by the frost, until the very latest period in Autumn.

Ailantus glandulosus, the heaven tree of the Chinese, is a fine stately tree, and though introduced from a warmer climate, bears the intense cold of our winters perfectly uninjured. When young it somewhat resembles our sumach, but when it attains the height of 90 or 100 feet, with its long pendant pinionated foliage, it will form a very picturesque and graceful object.

We must not forget in this brief notice the larches both of Europe and our country. *Pinus larix* has long been considered among the first timber trees of the other continent. The singularity of its foliage as a deciduous tree, its long declining branches and drooping spray, are well calculated to give variety to the landscape, and we are happy to see, that both this and our two American species, *P. microcarpa* and *P. pendula*, are becoming more generally objects of attention and cultivation.

Among the interesting trees of more recent introduction, and which are yet rare in this country, we may mention *Salisburia adiantifolia*, the Japanese maiden hair tree. The foliage is strikingly singular and beautiful, resembling that well known fern *Adiantum pedatum*, and the tree appears to be very hardy. The purple beech, a variety of *Fagus sylvatica*, is a very unique object with its strangely colored leaves, and a very splendid tree lately introduced from the banks of the Missouri and Arkansas is the Osage orange (*Maclura aurantiaca.*) Its vivid green leaves and rapid growth are already known to us, but it is described as being a tree in its native soils of thirty or forty feet in height, and bearing abundance of beautiful fruit of the size and appearance of an orange. The weeping ash is also a very unique and desirable object, and its long seemingly inverted shoots may be introduced in some situations with an excellent effect.

We have often regretted that in decorating the grounds of country residences so little attention is paid by the proprietors to hardy evergreen trees. Ornamental at any season, they are eminently so in winter—a period in this latitude when every other portion of vegetable matter yields to the severity of our northern climate, and when those retaining their coats of verdure uninjured are beautiful and cheerful memorials of the unceasing vitality of the vegetable world. Deciduous trees at this season present but a bleak and desolate aspect—a few evergreens, therefore, interspersed singly over the lawn or tastefully disposed in a few groups, so as to be seen from the windows of the mansion, will give a pleasing liveliness to the scene, which cannot fail to charm every person. We would earnestly advise every person engaged in ornamental planting to transfer some of our fine native evergreens to their lawn, park or terrace. We are aware that many think there is great difficulty in transplanting them with success, but experience has taught us that with the following precautions no more difficulty is found than with deciduous trees. In transplanting, choose the spring of the year at the time the *buds are swelling: cut as few of the roots as possible, and do not suffer them to become dry before you replace them in the soil.* Among our most ornamental evergreen trees may be mentioned the different species of Pine, natives of N. America. Several of them are fine stately trees, and one which is particularly ornamental as a park tree is the white or Weymouth pine, *Pinus strobus*. *Pinus rigida*, when old and large, is a very picturesque tree; and *Pinus alba rubra et fraseri*, the white, red and double spruce firs, are trees of moderate size, very generally diffused in the middle states and easily obtained. The well known balsam fir, *Pinus balsamea*, is such a beautiful evergreen, and succeeds so well in this climate, that it should find a place in the smallest plantations. We have observed it thriving well in confined spaces in cities. *Thuija occidentalis*, the arbor vitæ, is a very interesting tree, and as well as the exotic *T. orientalis*, will be considered very ornamental in districts where it is not common.

Among the most ornamental foreign coniferous trees, we will notice the Norway spruce, the drooping branches of which in a large specimen are so highly admired; the well known Scotch fir, the finest timber tree of Europe, celebrated for growing on thin soils; and the beautiful silver fir, *Pinus picea:* all of them are noble trees, and as they can be readily procured at the nurseries, should be found in the grounds of every country residence.

Several other species of this genus are thought the most beautiful trees of Europe, unfortunately yet scarce in this country. The stone pine, whose seeds are a delicious fruit, and whose "vast canopy, supported on a naked column of immense height, forms one of the chief and peculiar beauties in Italian scenery and in the living landscapes of Claude," and the not less interesting *Pinus pinaster* and *P. lembra* of the mountains of Switzerland. But the most desirable evergreen tree which flourishes in temperate climates is the classic cedar of Lebanon, *Pinus cedrus*. Its singular ramose branches and wild picturesque appearance in a large specimen, give a more majestic and decided character to a fine building and its adjacent scenery than any other tree whatever. It is a native of the coldest parts of Mt. Libanus, but, according to Professor Martyn, more trees are to be found in England at the present time than on its original site. As it is scarcely yet known as an orna mental tree in this country, we certainly do not know of an object better worth the attention of an aboriculturist.

We observe in foreign periodicals, that several magnificent hardy individuals, belonging to this section of trees have been lately introduced into Europe, and we hope before long they will find their way to the hands of *our* cultivators. Among the most remarkable we may mention a splendid new genus of pine (*Pinus lambertiana*) lately found in Northern California. The discoverer, Mr. D. Douglass, botanical collector to the London Hort. Soc., describes it as growing from 150 to 200 feet in height, producing cones 16 inches in length. He measured a specimen of 215 feet long and 57 in circumference.* Several other specimens of this genus, of much grandeur and beauty, are but lately introduced into cultivation, and which our present limits will barely permit us to enumerate. *Pinus Douglasi*, *P. monticola* and *P. grandis*, are immense trees from the North-west coast of America, *Pinus deodora* from Himmalaya, *P. taurica* from Asiatic Turkey, and *P. larico* from the mountains of Corsica, are spoken of as being highly ornamental. *Auraucaria imbricata*, a beautiful evergreen tree of South America, and *Cupressus pendula*, the weeping cypress of the Chinese, are extremely elegant—are found to withstand the climate of Britain, and would probably also endure that of this country.

We cannot close these remarks without again adverting to the infinite beauty which may be produced by a proper use of this fine material of nature. Many a dreary and barren prospect may be rendered interesting, many a natural or artificial deformity hidden, and the effect of almost every landscape may be improved simply by the judicious employment of trees. The most fertile countries would appear but a desert without them, and the most picturesque scenery in every part of the globe has owed to them its highest charms. Added to this, by recent improvements in the art of transplanting,† the ornamental planter of the present day may realize almost immediately what was formerly the slow and regular production of years.

Newburgh, N. Y.

* Trans. Linnean Soc. v. 15, p. 497.
† Vide Sir Henry Steuart on Planting.

HYMN.

The following hymn, by L. M. Sargent, Esq. was sung at the anniversary meeting of the Howard Benevolent Society in Boston, on Wednesday evening, January 15.

God of the rolling year—thy power
Expands the germ; unfolds the flower;
Matures at last the golden grain;
And then restores the iron reign
Of dreary winter, drearier still
To those whom age and penury chill.

Thy power of frost has locked the ground,
And streams in icy chains are bound;
Spare thou the heart of man below,
And bid the fount of pity flow.
Speed, Lord, thy backward stewards on,
Till mercy's holy work be done.

The board with costly viands spread,
The blazing hearth, the downy bed;
God, thou art just; what mortal dare
Call these his own, for thine they are!
Speed, Lord, thy backward stewards on,
Till mercy's holy work be done.

The hand that won the orphan's bread,
Is laid to slumber with the dead;
The barefoot boy, 'mid winter skies,
From door to door his labor plies.
Speed, Lord, thy backward stewards on,
Till mercy's holy work be done.

Loud howls the storm, 'tis cold and late,
The shivering outcast tries the gate;
The backward steward of the poor
Turns down his light and bars the door.
Speed, Lord, thy backward stewards on,
Till mercy's holy work be done.

ON BREEDING HORSES—[By T. A. KNIGHT, Esq. of Downton, Herefordshire.]—Having introduced, for the use of my tenants, a high priced stallion, of the breed of the large London dray horse, I wish to state to agriculturists the grounds upon which I anticipate much advantage from the introduction of so large an animal. He will, I have reason to believe, be, when full grown, not less than seventeen hands high, and very compact in form.

I conceive myself to have proved, by many experiments, of a part of which an account was published some years ago in the Philosophical Transactions, that the length of the legs of the offspring of all those animals which nature has intended to accompany their parents in flight, at an early age, is governed wholly by the habits of the female parent. This tribe of animals comprehends the horse, the cow, the sheep, and deer, and many others. If the female parent be of low stature, and descended from a breed of a similar form and size, the length of the legs of the offspring will be short, and will not be increased in length, though they will in strength, by any influence of its male parent, however tall and large that may have been; and the converse of this proposition will be found to be equally true.

The experience of almost every farmer must have taught him that horses with drop shoulders and bodies, and capacious chests, are more capable of bearing hard and long-continued labor than those of which the shoulders, and of course the chests, are shallow, and the legs long; but comparatively few know how rapidly the powers of draught of any animal mechanically decrease with the increasing length of the legs, comparatively with the depth of the shoulders and body. If a horse, proportioned as English horses now generally are, be sixteen hands high, his fore legs, measured from the elbow joint, will be about three feet, or nine hands high, and his shoulder about two feet four inches, or seven hands high. If such a horse be able to raise, by means of a cord passed over a pulley, a weight of a thousand pounds, another horse similar to that in every other respect, except that of having its legs eight inches shorter, would, on account of the mechanical advantage of its form, be able to raise twelve hundred and fifty pounds, or one-fourth more, with considerably less exertion; for his power would increase with the diminished length of his legs, nearly in the same proportion as the power of the weight upon the longer arms of the steelyards is increased by being made to recede from the point of suspension; and if the length of the leg of such horse, comparatively with the depth of the shoulder, were further diminished, its power would increase in an accumulating ratio. The enormous strength of a bull of mature age affords familiar evidence of the truth of these positions; and I doubt much whether the offspring of a Norwegian pony, and a strong and low draught mare, would not be found capable of drawing a heavier weight up hill, to any considerable distance, than the largest horse of the ordinary form and proportion; whilst it would not, probably, exceed two-thirds of its weight, nor require more than two-thirds the quantity of food; and it would possess much more activity, and be much less subject to accidents. And I have good reason to believe that more perfect animals, for supplying mankind with food, may generally be obtained by cross-breeding from females of small, and male animals of large size, than from any breed of fixed and permanent habits, relatively to size.—[Farmer's Magazine]

CALVES.—The following method of managing calves strikes us as being correct, particularly when the cow gives an abundance of milk. When the supply is small, we should suppose the calf would require additional food besides the milk.

"A friend of ours," says the Genesee Farmer, "has been very successful for many years in producing veal of the finest quality, by the following method: During the first fortnight, the calf is allowed one-half the milk, three-quarters during the third week, and the whole during the fourth week. This is his rule for common cows. In extraordinary cases, he allows more or less, according to circumstances; but deems it of great importance that the calf should be *full fed* during the last week.

"The reason which is given for this practice is, that if the calf takes all the milk at first, it will grow fast, and soon become too large for its supply of nourishment; but if it be stinted at first, its mother's milk will be commonly sufficient to fatten it at the close of the month."

FEEDING LIVE STOCK IN WINTER.—There is perhaps nothing relating to rural economy in which farmers differ more, both in theory and practice, than in feeding their cattle in the winter season. We speak not now of the different kinds of fodder, or of their comparative value in the feeding of stock, but merely of the manner and frequency with which the cattle are fed.

Many farmers believe it indispensable, both as to the good condition of their stock and the greatest economy of fodder, to feed them five times, at least, each day, during the winter; while others practise feeding but three or four times in a day; and again, others but twice.

Experiment alone can prove which of these modes of feeding will carry stock through the winter in the highest order, and with the least expense of fodder. Our own experience, on the subject, is decidedly in favor of feeding but twice in a day. More than twenty years' observation and experience in the keeping of stock, in a climate where, on an average, dry fodder is required to be given more than seven months in the year, has given us an opportunity to test the value of the several modes of feeding above mentioned. We were first induced to try the experiment of feeding twice in a day only, from information communicated to us by a very intelligent and successful farmer, in a neighboring town. He said he had, a few years before, had occasion to call on a farmer's widow to aid in the appraisal of several cows, and found them near the end of the winter in such high order as to draw his particular attention.

He inquired of the widow, particularly, the manner in which they had been kept, and found she had given them nothing but hay, through the winter; and that in consequence of having no man or boy to attend her stock, she had been obliged to do it herself; and being in rather feeble health, she had never fed them but twice a day. This led him to examine particularly as to the kind and quality of the hay with which the cows had been fed. He found the hay not so good as his own, while the cows were in much higher order than his; though his had been fed five times a day through the winter.

From a knowledge of these facts, he afterward adopted the same mode of feeding, giving his cattle just so much twice in each day, as they would eat up perfectly clean, and no more; and has since found it, by experience, both a saving of fodder and a benefit to his stock. From this information we adopted the practice of feeding but twice in a day, something more than ten years ago, and have found, or think we have found, the same favorable results.—[Northern Farmer.]

NEW INK DISTRIBUTOR.—We were lately shown, by WARREN JENKINS, of this town, a new or improved machine, invented by himself, for regulating, with mathematical exactness, the distribution and application of ink to the types. This machine is the first attempt of the kind by the inventor, and, therefore, imperfect in some of its mechanical details; but, in its present condition, it answers the intended purpose very well. We have scarcely a doubt that the principle upon which the machine is constructed is correct, and that a more perfect mechanical construction of all its parts will make it fully to answer the purposes for which it is designed.

Should our anticipations be realized, and there seems little room to doubt that they will, an ordinary pressman, with the assistance of a boy capable of moving the *rollers*, can take any number of *clear, uniform* impressions, extending throughout a whole *form* or a whole book. This machine will, therefore, be no less important to readers who desire beauty and uniformity in what they read, than to printers who are responsible for the quality of their work.

When the machine is once regulated so as to take a suitable quantity of ink, which will be the labor of but a few minutes, the pressman is relieved from further care in relation to the uniformity of the impressions, as the application of the ink to the rollers is entirely beyond the control of the boy who does the rolling. We may also add, that the machine is of simple construction, and of course, little liable to get out of order; whilst the cost will probably place it within the reach of every person owning a press. Several other advantages might be enumerated, but we think enough has been said to entitle it to the consideration of printers.—[Cincinnati Journal of Science.]

On the Improved Art of Boring for Water, as practised in the United States: and as the Foundation of a Water Company in New-York. By JOHN L. SULLIVAN. [From the American Railroad Journal.]

THE practice of boring for water appears to have been first undertaken from the rational probability of its success; but it was found necessary very much to improve the instruments of the art, on account of the nature of the rock and soil. And, for economy of labor, to devise a mode of applying the power of the steam engine to a machine which raises the chisel and allows its blow by sudden release and fall.

The alluvial soil, in which the operation is often to be carried on more deep than wells could be made, required, to reach the rock, the invention of an iron tube, having the quality of great stiffness, without any considerable projection at the joints, both in order to be forced down by powerful leverage, and to be clear within, for the operations to be carried on through it. Being undermined at the same time that pressure is exerted, it, by successive *lengths*, reaches the rock to be bored into, *through it*. Should there not, as often occurs, have been found abundance of water at the surface thereof, implements to overcome any obstacle in the way have also been contrived.

The tube being entered a little into the rock, and pressed down, makes therewith a tight joint; and thus a perforation to the depth of *seven* hundred feet has in several instances been made. There are, indeed, accidents to which the operation is liable, but there are, also, implements to meet such exigencies; and experience has now rendered their management easy. The bore is generally first two and a half inches diameter; and if more water is required than it affords, or permits, it is enlarged to seven inches, by an instrument called the *reamer*.

When the work commences in a rock above ground, it is usual to excavate a small well, as the water often rises to the surface, or nearly so; or the bore is enlarged for the reception of the pump.

To bring up large quantities from a small bore, hydraulic principles have been superadded; which induce a more lively flow of water to the boring, and up into the pumps. The former, by abstracting the column and making a vacancy much below the height to which the water ordinarily rises; the other by placing the pumps externally on the sides of the bore, lower than the height to which the water rises. Thus availing of the natural difference between the head and the position of the pumps; that thus, filling quicker, they may be larger, and deliver more.

To be successful, this art seems only to require suitable instruments and requisite skill; and there have now been so many instances, that it begins to become a rational inquiry, whether there may not be, in the *geology* of our country, good cause always to expect success; and, instead of looking to distant ponds and streams for a supply of pure water, whether there may not be a provision by Nature, even for cities densely peopled, on the very spot they occupy?

The researches of geology seem to have established the most material facts in this inquiry, that the *primitive* rocks are always stratified. It appears, that, while the earth was yet without form, and void of life, the crystallization which constitutes the rocks was going on, and forming them in strata; of which, the cause can be but conjecture. It is possible that the

process extricated the substance that makes the division between them, till its quantity was sufficient to deposit; and, being settled, the crystallization recommenced, thus forming successive layers. But that, besides the strata of its own kind, general layers of different kinds should have successively formed, is not less true than curious. In one mass, they might not have been so easily raised into mountains. Thus the *primitive* rocks are, it is believed, invariably found in the order or succession, upwards, of granite, granular limestone with quartz, gneiss, mica slate, soapstone, sienite, succeeded by the *transition* rocks, metalliferous limestone, argillaceous and siliceous slate, graywacke slate, and rubblestone; which are again succeeded by the secondary rocks, red sandstone, breccia, compact limestone, gypsum, and rocksalt; and over these the diluvial masses, or aggregations of rocks and earth; and among them the recent alluvial deposits.

Thus the granite of the highest mountains must, in its formation, have been level and low; but, when the formation of the dry land took place, was uphove by some physical cause, which the Creator had prepared.

On the Alps, in the vicinity of Mont Blanc, stupendous masses of granite stand up thousands of feet, as if protruded through strata of more recent formation, which slope down from them.

It appears that much the same operations, on the grandest scale, have prepared the continents for the habitations of man. The same *fiat* which caused dry land to appear, created the vallies, and the plains, the streamlets, and the rivers, and set bounds to the sea.

On the continent of North America, there are, obviously, three distinct systems of mountains. The central line of the Appalachian, being the Allegany mountains, is granite. And the eastern border of the base of the system may be described as appearing at *the falls of all the rivers'* nearest tide, discharging into the Atlantic south of the Hudson. In Darby's geographical view of the United States, page 81, it is said, "this inflected line, from New-York to the Mississippi, is marked, at distant intervals, by falls, or rapids, in the bed of the streams."

The Allegany mountains, being two thousand four hundred and seventy-three feet high, attract and condense the vapors and clouds, and is well known to be a more rainy region than the plains below, giving rise to numerous rivers.

It is reasonable to think, that when the granite strata rose from their original position, that cavities were formed by their disruption, and that whatever spaces occur, must be filled with water, and be the passage for it thence among the strata to the ocean; and if so, this water may be *intercepted*, in part, by perforating the strata. This might have been reasonably expected, and this expectation has been verified by trials.

The nearest boring to the Alleganies is at the Public Armory, near Harper's Ferry, on the Potomac. The next at Baltimore; again near the Schuylkill; again at Princeton; then at New-Brunswick; Somerville; Amboy; Newark; and Jersey City.

On the island of New-York there were stronger reasons for expecting to find water in the rock than elsewhere, because here commences the *third system of mountain formation*, dividing the waters of the *Hudson and Lake Champlain* from those of the bays of New-England. It commences here and extends northward, forming the mountains of Berkshire and Vermont. It is a range of primitive rock, the strata of which rise from the west and probably decline towards the east from the centre of New-England.

We have the authority of Professor Eaton, a teacher of Geology, to say that the strata of primitive rock, after spreading down from the west as far as the Hudson, begins to rise, and come to the surface in the Berkshire mountains. That they do thus actually slope upwards from the west is known by the excavations made in this island.

The city thus being at the point where the range commences its rise northward, at the same time the strata dip west, the waters therein *cannot* flow *east*, and must, of course, flow *south*. And that the spaces are full of pure water, is not only ascertained by its outpouring at the head of the streams of the Highlands in a thousand places, but by its actual abstraction here, in a number of instances, and by the *spontaneous outpourings* of it also *here* on the spot, in the very centre of the city.

The natural indications of water here were strong before any experiment was made. The rock springs of the 1st Ward were known before the Revolution; and the central valley, before it was occupied by streets, was the seat of large and deep collections of spring water; and one of these was, in 1798, deemed by the Common Council sufficient for the whole city; and it was a question whether it should not be *preserved for this purpose*. But it was filled up. Nevertheless, the springs which fed it are not lost: they continue to flow, and are, in fact, *recovered* by the effect of the deep tube above described. The two or three millions of gallons a day, which then flowed here, are regained and protected by a mass of earth from fifty to a hundred feet deep.

The proof of this fact is in the success of *three* tubes. Two of them in West Grand street, the other in Lawrence, near Canal, at Cram's distillery; and this one continually overflows on being reduced one or two joints.

There is also proof of the like issues of pure water on the east side, north of Chatham square, by the success of all the *tubes* that have been set down to the surface of the rock near the East river.

But on the west side the water is not obtained without penetrating the rock about one hundred feet, being on the top of the slope thereof, but this operation has in every instance been successful.

The general reason for expecting success in this operation being thus explained, the inquiry becomes perhaps the more interesting, how often the theory has been confirmed by practice? The instances have not been many, but are rather convincing. The least likely to succeed was that of the botanic garden, because begun on the bare apex of an elevated rock, about the highest ground in the island. It penetrates the rock 112 feet, and the water stands 94 feet deep, constantly renewed.

The next proof is one mile more south, at the great well of the Fire Engine Reservoir, 113 feet deep, of which 96 are in the rock, and considerable water is obtained.

West of this, near the Hudson, are those about one hundred feet deep, which supply the city with rock water, by means of drays; also, that at a distillery on Perry street, which gives 22 to 26,000 gallons a day.

More southerly, and on the highest part of Broadway, near Bleecker street, is that belonging to the Manhattan Company, lately the subject of consideration by the Board of Commissioners.

It will be recollected that this Company was instituted to bring in the Bronx water, which, at the time their charter was granted, was estimated to cost about 200,000 dollars; but, by more complete surveys, it was found very likely to absorb their whole capital of two millions, so as to defeat the purpose of employing the *surplus* of 1,800,000 as banking capital. The Company had employed double the amount of the original estimate in supplying the city with the best water they could command, when the progress of the art of boring for water came to the knowledge of the directors.

After making a well 42 feet deep, down to the surface of the rock, they penetrated it 400 feet, in the course of which operation good water was found between *all the lower strata*, and not less than *eight times*.

They were so well satisfied with the result, as to have it reamed to the diameter of 7 inches: and, by applying only the power of a *six horse* engine, raise about 130,000 gallons of water a day. And the Board of Commissioners pronounce it good and wholesome; it is in fact soft, and clear as crystal.

They also calculate that 42 such borings only would supply the city with six millions of gallons a day. This one cost ten thousand dollars.

The Company may possibly have expected to raise, at once, as much as would supply the pipes already laid down, by their agent, stated at nearly 700,000 gallons a day; if so, it was rather a too great demand on one boring, though this one is, [illegible] improved mode of management, probably capable of producing considerably more than it as yet has [illegible]

[illegible] from some other cause, probably the preference which the stockholders give to *banking* with their capital, their water-works are offered for sale to the city; and might well have been an object of purchase to any party competent to their perfection, as no doubt all the houses along an extensive range of pipes would take the water, were it all as good as that thus derived from the rock.

It has thus been shown why the *general formation of the country* is favorable to the system of deriving water from the rock, and why New-York, specially favored, has only to penetrate a little deeper than usual to find pure water in great abundance, at a moderate expense, and, when thus obtained, incomparably finer than that of the Schuylhill at Philadelphia, and free from all unfavorable influences of climate or locality: for, however dense the population of the city may be, the rock water is defended by the depth and nature of its channels.

An apology to your readers would be offered for the length of this article, but that the subject is now becoming an interesting one to most of our sea-port cities. At New-Orleans a company is incorporated, having a large capital, and a banking privilege. The Mississippi is perhaps the only river in our country that, like the Nile, comes at midsummer cool from distant mountains of ice.

But no stream can be other than a drain of the district it waters; and it is well known that impurities combine chemically with water.

The recent survey and report for an aqueduct route from the Croton, though at an expense very disproportionate to the present city, may be preferred by the community. But it is possible that the certainty and readiness, the inexhaustible nature of the sources which come hither in the natural aqueducts of the rock, have not yet been duly appreciated by the public. They certainly have not been by the commissioners; and it remains yet for public opinion to decide the interesting question, how the city of New-York shall be supplied with pure and wholesome water.

To leave behind so productive a source of supply as the rock affords, is like leaving a *fortress in the rear*.

This resource will, at all events, be the object of a company of capitalists. It has been solicited of the Common Council that leave be given to deliver it by aqueduct pipes. It is stated in the Water Committee's recent report, that the city actually pays 273,750 dollars for the water distributed by drays; and the shipping 50,000 dollars. They compute the number of buildings for which water would be required at 35,000. They state that in the city of London there are eight water companies. It is not stated why the *Corporation* did not supply that city. The explanation would have been that, where capital is to be applied, those do it most economically who have the most interest in making it effectual. One of them is stated to have risen greatly in value.

New-York, January 11, 1834.

[*From the Token for* 1834.]

FLOWERS—BY MRS. SIGOURNEY.

I'll tell thee a story, sweet,
Here under this shady tree;
If thou'lt keep it safe in thy faithful breast,
I'll whisper the whole to thee.

I had a lover, once,
In my early, sunny hours,
A fair and fanciful youth was he,
And he told his love in flowers.

I remember its waking sigh—
We roam'd in a verdant spot,
And he culled for me a cluster bright
Of a purple forget-me-not.

But I was a giddy girl,
So I toss'd it soon away,
And gather'd the dandelion buds,
And the wild grape's gadding spray.

He marked their blended hues,
With a sad and reproachful eye,
For one was the symbol of thoughtless mirth,
And one of coquetry.

Yet he would not be baffled thus,
So he brought for my crystal vase,
The rose geranium's tender bloom,
And the blushing hawthorn's grace.

And a brilliant and fresh bouquet
Of the moss-rose buds he bore—
Whose eloquent brows, with dew-drops pearl'd,
Were rich in the heart's deep lore.

I would not refuse the gift,
Though I knew the spell it wove,
But I gave him back a snow-white bud,
"Too young, too young to love."

Then he proffer'd a myrtle wreath,
With damask roses fair,
And took the liberty—only think—
To arrange it in my hair.

And he press'd in my yielding hand,
The everlasting pea,
Whose questioning lips of perfume breathed
"Wilt thou go, wilt thou go with me?"

Yet we were but children still,
And our love, though it seemed so sweet,
Was well express'd by the types it chose,
For it pass'd away as fleet.

Though he brought the laurus leaf,
That changes but to die,
And the amaranth, and the evergreen,
Yet what did they signify.

Oft o'er his vaunted love
Suspicious moods had power,
So I put a French marigold in his hat,
That gaudy, jealous flower.

But the rootless passion shrank
Like Jonah's gourd away,
Till the shivering ice-plant best might mark
The grades of its chill decay.

And he sail'd o'er the faithless sea,
To a brighter clime than ours—
So it faded that fond and fickle love,
Like its alphabet of flowers.

Apparatus contrived by Dr. Hare for separating Carbonic Oxide from Carbonic Acid, by means of Lime Water. [From the Mechanics' Magazine.]

Lime water being introduced in sufficient quantity into the inverted bell glass, another smaller bell glass, C, is supported within it, as represented in this figure. Both of the bells have perforated necks. The inverted bell is furnished with a brass cap, having a stuffing-box attached to it, through which the tube D, of copper, slides air-tight. About the lower end of this tube, the neck of the gum elastic bag is tied. The neck of the other bell is furnished with a cap and cock, surmounted by a gallows screw, by means of which a lead pipe, P P, with brass knob at the end suitably perforated, may be fastened to it, or removed at any moment. Suppose this pipe, by aid of another brass knob at the other extremity, to be attached to the perforated neck of a very tall bell glass filled with water upon a shelf of the pneumatic cistern, on opening a communication between the bells, the water will subside in the tall bell glass, over the cistern, and the air of the bell glass, C, being drawn into it, the lime water will rise into and occupy the whole of the space within the latter. As soon as this is effected, the cocks must be closed, and the tall bell glass replaced by a small one filled with water, and furnished with a gallows screw and cock. This bell being attached to the knob of the lead pipe, to which the tall bell had been fastened before, the apparatus is ready for use. I have employed it in the new process for obtaining carbonic oxide from oxalic acid, by distillation with sulphuric acid in a glass retort. The gaseous product consists of equal volumes of carbonic oxide and carbonic acid, which being received in a bell glass, communicating as above described by a pipe with the bell glass C, may be transferred into the latter, through the pipe, by opening the cocks. As the gaseous mixture enters the bell C, the lime water subsides. As soon as a sufficient quantity of the gas has entered, the gaseous mixture may, by means of the gum elastic bag and the hand, be subjected to repeated [illegible] of lime water, and thus depurated of all the carbonic acid. By raising the [illegible] the outer bell, A, the purified carbonic oxide may be propelled, through the [illegible] lead pipe, into any vessel to which it is desirable to have it transferred.

CRUCIBLE FOR FUSION.—Make a hole in a Hessian crucible, holding two or three quarts; put inside of this crucible the cover of a smaller crucible, so that it may rest about three-fourths of the depth; make with a file several notches around this cover to admit the air fairly, having the knob of the cover uppermost. On this knob place a little crucible containing the metal, which must be covered; put some lighted charcoal around it, and then fill up with coke, so as to cover entirely the interior crucible. Connect this apparatus with a blacksmith's or other bellows, and keep up a constant blast, supplying the waste coke as it is consumed; in the course of 20 minutes the steel will be melted. Other minerals, even some that are reputed infusible, will yield in like manner. This simple and cheap apparatus abridges time and labor surprisingly, and effects what, with the common and costly furnaces, would be impossible.—[Jour. de. Con. Usuelles, tom. xv. p. 143.]

THE FLOATING GARDENS OF CASHMERE.—The city of Cashmere, being the capital of the province of that name in Asia, is situated in the midst of numerous lakes, connected with each other, and with the river Vedusta, by canals, separated by narrow lines and insulated plots of ground. Upon these lakes are floating gardens, cut off generally from the body of the lake by a belt of reeds; the cultivation of which is not only very singular, but highly profitable, and worthy of imitation in Europe as a resource for raising food for man. The second number of the 'Journal of the Geographical Society' contains a notice of the Natural Productions and Agriculture of Cashmere, from which the following account is compiled:

The city of Cashmere is subject to considerable inundations, which have become annually more frequent, through the neglect of the government in not checking the accumulation of weeds and mud, which diminish the depth, and consequently increase the surface of the lakes. This has suggested the expediency of a floating support, by which vegetables are cultivated in safety, deriving as much moisture as is beneficial without the risk of being destroyed. Various aquatic plants spring from the bottom of the lakes, as water lilies, sedges, reeds, &c.; and as the boats which traverse those waters take generally the shortest lines they can pursue to their destination, the lakes are in some parts cut into avenues, as it were, separated by beds of sedges and reeds. Here the farmer establishes his cucumber and melon floats by cutting off the roots of the aquatic plants about two feet under water, so that they completely lose all connection with the bottom of the lake, but retain their situation in respect to each other. When thus detached from the soil, they are pressed into somewhat closer contact, and formed into long beds of about two yards breadth. The heads of the sedges, reeds, and other plants of the float, are next cut off, and laid upon its surface, and covered with a thin coat of mud, which, at first interrupted in its descent, gradually sinks into the mass of matted stalks. The bed floats, but is kept in its place by a stake of willow driven through it at each end, which admits of its rising and falling in accommodation to the rise and fall of the water. By means of a long pole thrust among the reeds, at the bottom of the lake, from the side of a boat, and turned round several times, a quantity of plants are torn off from the bottom, and carried in the boat to the platform, where the weeds are twisted into conical mounds, about two feet in diameter at their base, and of the same height, terminating at the top in a hollow, which is filled with fresh soft mud, and sometimes wood ashes. The farmer has in preparation a number of cucumber and melon plants, raised under mats, and of these, when they have four leaves, he places three plants in the basin of every cone or mound, of which a double row runs along the edge of every bed, at about two feet distance from each other. No further care is necessary except that of collecting the fruit, and the expense of preparing the platforms and cones is very trifling. Mr. Moorcroft traversed about fifty acres of these floating gardens, growing cucumbers and melons, and saw not above half a dozen unhealthy plants; and he says, he never saw in the cucumber and melon grounds, in the vicinity of populous cities in Europe or in Asia, so large an expanse of plant in a state of equal health or luxuriance of growth. The general depth of the floating beds is about two feet, and some of them are seven feet broad. The season lasts for three months and a half, beginning in June. From the first setting of the fruit to the time of pulling, seven or eight days are the ordinary period. Thirty full-sized fruit from each plant, or from ninety to a hundred from each cone, are the average crops. The

seed of the melon is brought annually from Baltistan, and the first year yields fruit of from four to ten pounds each in weight; but if the seed be re-sown, the produce of the second year exceeds not from two to three pounds. Unless when eaten to great excess the melon produces no disorders, and it is remarked that healthy people who live upon this fruit during the season become very speedily fat; and the effect upon horses fed upon this fruit is reported to be the same. In the early part of the season, cucumbers of full size sell at the rate of about three for a piece of coin of the value of a half-penny; but as the weather becomes hotter, and the plants get into full bearing, ten, fifteen, and even twenty, are purchased for this price. It is calculated that every cone yields a money return of about eighteen pence. Allowing sixpence for labor of every description, and including also the tax, the clear profit is a shilling for every two square yards. The yield of the melon is numerically less, but the return of profit is at least equal. No other vegetables are raised upon the spaces between the cones, although Mr. Moorcroft thinks that onions, cresses, and other useful vegetables, might be raised upon them; and water-mint grows spontaneously upon the floats.

Cashmere, or Cassimere, is one of the northern provinces of India within the Ganges. It is surrounded by mountains, and from its beauty and fertility has been called the Paradise of the Indies. It contains upwards of 100,000 villages, is well stocked with cattle and game, and is said to be unmolested by beasts of prey. The people are ingenious, and resemble the Europeans in their persons, and the women are fair and tall. The famous Cashmere shawls derive their name from this country, though at present the supply that actually comes from it is comparatively small.

Cultivating the Mulberry.—The following, we believe, is from "Goodsell's Genesee Farmer":

So well are we satisfied with the result of our experiments, and that it is unnecessary to go through with all the routine of first sowing the seed in beds, and then transplanting the trees from the seed bed to the nursery, and from there to the orchard, then to wait for them to become firmly rooted, and to expand their tops, before worms can be fed from them, that we design next spring to sow another pound of seed, from which we hope to raise from eighty to one hundred thousand trees, from which to feed from until our orchard shall arrive at maturity, and ultimately to transplant the young trees into hedges, which for large establishments are no doubt preferable to standard trees, as it facilitates the gathering of leaves, and renders the whole less expensive. We are fully confident that every seedling tree one year old is capable of furnishing food for one worm, or producing one cocoon; if so, the greatest obstacle to the immediate introduction of this branch of domestic manufacture is removed, and instead of waiting many years, and incurring heavy expenses in the cultivation of trees, before the manufacture of silk can be commenced, or any returns had from the investment, it requires no more time than is necessary to clear off a piece of land, and obtain a crop of wheat, and we are satisfied that the same labor bestowed will yield a richer harvest. I am, sir, yours, &c.

Edwin Stanley.

Adams' Basin, Nov. 12, 1833.

Alum for Vines.—A foreign journal, of some ability, recommends four ounces of alum to be mixed with four pellets of clay, by means of a sufficient quantity of water, and the roots of the vine being uncovered on a fine day towards the end of the winter, they are to be moistened with this mixture, and the earth then changed, so that what was previously uppermost shall be undermost. It is asserted that through this operation a vine produces a great additional quantity of grapes.

Western Forests.—There is a grandeur, as well as beauty, in the deep forests of the west. 'Tis true, we have no high hills that in summer wave their green summits to the breath of heaven, yet the vast and almost unbroken amplitude of our forests, like the gentle undulations of a banner flung on the breeze, conforms to the graceful swells and slopes that give a pleasing variety to the formations of our country. If we have no abrupt elevations to give picturesqueness to the shade, we have no dark mountain to frown upon us. Though our forest would appear to a spectator above them as if clipped with a tiresome evenness, yet their shady aisles are not wanting in those charms which afford pleasure to the lover of nature, as seen arrayed in her first and wildest vestments. The many kinds of timber which compose them destroys in a great measure that sameness of appearance which would otherwise fatigue the eye. Monotony is forgotten, as our attention is arrested by tree after tree fit for the "mast of some tall admiral," each decked with a different foliage, and exhibiting no evidence of having been rocked side by side with the same winds for a century, except in their towering height, and like unwieldly dimensions. Often in the ramble of a few moments, we are called on to admire the oak, monarch of the woods, the bur-crowned chesnut, the column-stem and cone-topped white-wood, the fruit-bearing walnut, the flexile hickory, the white-limbed sycamore, the graceful elm, the broad-leafed linn, the mountain ash, the whispering beech, the sugar maple, the balm of Gilead, the cucumber, butternut, cherry, mulberry, sassafras, and a host of forest trees unnumbered, as well as flowering shrubs, that give beauty, interest and worth, to the wild old wood.

To its depths—to its depths, then, gentle reader, and enjoy the stroll of an hour, where

"Mighty winds make music not unlike
The dash of ocean on his winding shore,
And lull the spirit while they fill the mind."

[Ohio Atlas.]

Timber, by the process of charring or burning the surface, may be preserved for an indefinite time, even though exposed to damp, or buried in the earth. The utility of charring timber used for posts or water works, is so evident, that we are surprised it is not more generally attended to. The most wonderful proof of the indestructibility of charcoal timber is given in Watson's Chemical Essays, where we are informed "that the beams of the theatre of Herculaneum were covered with charcoal, by the burning lava which overflowed that city; and during the lapse of 1,900 years, they have remained as entire as if they had been formed but yesterday." This property was well known to the ancients, as the famous temple of Ephesus was built on piles charred to preserve them from decay; and some years ago, piles were found in the Thames, charred, in a perfect state of preservation, in the very spot where Tacitus relates that the Britons drove in piles to prevent the attack of the fleet of Julius Cæsar.

Hops.—A gentleman from Germany informs us that American hops have been tried in that country and obtained a decided preference to the English; and that an increased demand from that quarter may be looked for hereafter.—[N. Y. Shipping List.]

Sore Tongue in Horses.—This distressing disease, we learn, prevails extensively among horses in this vicinity. We have handed us for publication the following recipe, with the assurance that it is an effectual remedy for this sore disorder.

Take 2 oz. alum, 1 oz. borax, ½ oz. blue vitriol, ½ oz. copperas, ½ lb. honey, and one quart of vinegar, with a little sage; steep, and make a wash, with which cleanse the mouth of the horse three times a day, taking care to keep him from taking cold.—[Amh. Cab.]

For dipping Black Silks, when they appear rusty or faded.—Your discretion must be used whether the silk can be roused, or whether it requires to be re-dyed. Should it require re-dying, this is done as follows: for a gown, boil two ounces of log-wood; when boiled half an hour, put in your silk, and simmer it half an hour, then take it out and add a piece of blue vitriol as big as a pea, and a piece of green copperas as big as the half of a horse bean; when these are dissolved, cool down the copper with cool water, and put in your silk, and simmer half an hour, handling it over with a stick; wash and dry in the air, and finish as above. If only wanting to be roused, pass it through spring water, in which is half a tea spoonful of oil of vitriol. Handle in this five minutes, then rinse in cold water and finish as above.

For dying Green.—Take blue and oil of vitriol, mix them together; then take fustic, boil it till it is a good color, then put in your vitriol until it is the shade of green you want; wet your silk all over with warm water first, put your dye on, and hang it in the sun, then brush it off as before.

Business of the Canal.—We have been politely furnished with the following return by Gen. Humphrey, canal collector in this city:

The whole quantity of down freight upon which toll is charged by weight, that was conveyed on the New-York canals to Albany, in 1833, amounts to one hundred and fifty-two thousand nine hundred and thirty-five tons, at 2000 pounds per ton, viz.:

Barrels of flour	734,133
" ashes	22,922
" provisions	13,489
" whiskey	19,908
Hogsheads do.	873
Bushels of salt	17,116
" wheat	298,504
" coarse grain	122,944
" barley	257,252
Boxes of glass	2,187

Also, the following, upon which toll is not charged by the ton:

Cords of wood	20,960
Feet of timber	74,350
" lumber	55,338,547
M. of shingles	74,350

There were 68,321 tons of merchandise, furniture and sundries, sent up the canal from Albany.

The whole amount of tolls received by the collector at Albany is $323,689 88, making an increase of $87,053 56 over the receipts of the last year.

Number of boats arrived and cleared, 16,834.

Amount of produce, &c. shipped at and passed Utica on the Erie Canal during the year 1833.

		Passed.	Shipped.
Domestic spirits	gallons	1,609,616	493,169
Boards and scantling	feet	40,804,377	114,626
Timber	do.	1,733,255	401
Shingles	M.	55,287	4,152
Staves		9,264,523	35,307
Flour	barrels	967,813	16,055
Provisions	do.	27,919	3,808
Salt	do.	62,860	253
Ashes	do.	29,508	2,478
Lime	do.	15,357	406
Beer	do.	586	90
Cider	do.	284	11
Wood	cords	4,808	—
Wheat	bushels	1,175,423	37
Coarse Grain	do.	302,578	21,060
Bran and Ship Stuffs	do.	300,518	14,622
Peas and Beans	do.	8,260	366
Clover and grass seed	pounds	1,460,628	34,229
Wool	do.	1,166,673	393,420
Cheese	do.	1,857,944	1,279,908
Butter and Lard	do.	4,554,215	1,405,861
Hops	do.	443,236	291,927
Fur and peltry	do.	268,521	5,723
Gypsum	do.	18,750,501	—
Stone	do.	8,805,039	187,204
Merchandise	do.	137,357,547	5,148,195
Furniture	do.	7,595,732	589,548
Clay	do.	1,821,565	—
Coal	do.	6,423,090	95,905
Pig Iron	do	1,810,215	12,350

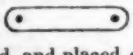
The amount received for tolls, &c. at this office during the past year is $55,064 32; which exceeds the amount received in 1832 by the sum of $8,019 54.

Collector's Office, Utica, Dec. 27, 1833.

On increasing the Facilities for Transportation by Water. By JOHN N. POMEROY. To the Editor of the Mechanics' Magazine.

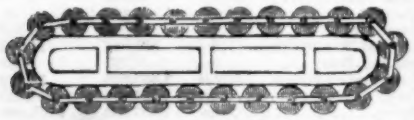
SIR—Although my acquaintance with you is very limited, I hope you will pardon the liberty I take in addressing you. My profession necessarily occupies a great portion of my time and attention; nevertheless, I am not indifferent to the progress of improvements which are going on at such an astonishing rate in our country. The wonderful facilities for rapid transportation afforded by the introduction of railroads, and its vast superiority, in velocity at least, to the modes of transportation on the natural water communications throughout the country, could not but excite the inquiry—"Is it true, then, that the various rivers and arms of the sea, which intersect the face of the earth, and which have been heretofore considered as great highways for the convenience of man, and designed as such—is it true that the progress of improvement is to prove these but *obstacles*, rather than *facilities*?" The present superiority of the railroad system would seem to indicate an affirmative answer to this question; but a reflecting mind would be unwilling to admit it, and would be led to inquire into the *reason* of the apparent superiority, and would, at all events, be induced to doubt the wisdom of man, rather than his Maker. What, then, is the reason why we cannot pass with equal (or with greater) facility and velocity through the water, as on the railroad? It is doubtless, chiefly, if not wholly, on account of the *law of resistance* to motion in fluids: can that be obviated? I do not hesitate to say it can, and will be. How? This leads me to the object of this letter, which is to describe a plan which I have invented for that purpose, and ask your opinion, and, through you, the opinion of practical men, of whom, I think, you must number many among your friends or acquaintances. It appears to me to obviate the difficulty above referred to; but is the plan *practicable*; or are there insuperable practicable objections to it? In order to give you an idea of the plan above mentioned, or machine, I may as well describe the one which I have made; first premising that the object is to have the *sustaining* part of the vessel the part which moves and *gives motion*. The machine which I have made is composed, first, of 25 tin cylinders, 8 inches long, 2 inches in

diameter, with caps at each end, water-tight, and a pivot also in each end, in the centre of the cap or head, say a half inch in length. These cylinders are connected together by a chain, composed of narrow strips of tin, having



holes at each end, and placed on the pivots, so that the cylinders nearly touch each other, not

quite; and so that the cylinders can revolve on the pivots without interfering. These cylinders, thus connected at each end, are made to inclose the *hull*, or boat, which is (as I have



made it for experiment) a frame about 18 inches long, 8¼ inches wide, and 4 inches in height or thickness, and so turned at each end as to admit an easy path for the cylinders, and also so that the cylinders may strike the water in a proper direction. There is a flange on the exterior edge, or circumference of the frame, to prevent the cylinders from rolling off. It will now be perceived, I think, that a force exerted on the pivots in the same direction, on any one or more of the cylinders, that it will give motion to the whole, and when placed in the water, the machine, sustained by the buoyancy of the cylinders, must move as fast *ahead* as the cylinders pass through the water to the *stern*. This power in my machine is applied to the pivots of the cylinders by two wheels, on a shaft, which passes transversely through the machine, and plays on gudgeons at each end—the wheels adapted by cogs to act on the pivots, and the shaft turned by a spring.

Now, what are the practical objections to the above? I admit the first impression must be unfavorable—it is, as a water-craft, entirely *unique*; but, appearances aside, it may be said that a vessel on this construction cannot be made sufficiently strong to sustain itself in rough water, without being too heavy to derive the benefit proposed from the cylinders. It appears to me that the form of the *hull* is well adapted for strength, without much weight. As to the cylinders, it is more doubtful. I have supposed a vessel made of about 100 feet in length, and 30 feet broad, 10 feet high between the two floors, having 60 cylinders or barrels, each 30 feet long, 5 feet in diameter, and having 25 barrels, say, in the water, which would be about the number. Now, 25 of these barrels, *entirely* immersed, would sustain 450 tons; and it appears to me that a vessel *complete* of this construction and size might be made considerably within the limits; and it is to be borne in mind, that, from its mode of progression, it would not conflict with rough water, as ordinary vessels do, as the impinging cylinders would rather '*nullify*' than make war with the opposing element. Would it not be *top-heavy*, and careen? I see no objection to its being made sufficiently broad to avoid this difficulty. Would it not be incommodious? I should judge not, but the reverse, as the rooms might be made square, high, and with sufficient windows at the sides; and I see no objection to having *guards*, a deck fore and aft the cylinders, and a promenade deck over the cylinders. Would it require more power to produce a given velocity than ordinary steamboats? I think very far less; but the cylinders, which are in the water, would be much impeded in their revolutions (which must be rapid) by the water If this be a difficulty, it may be avoided by wheels on the pivots, or gudgeons of the cylinders, which should sustain the cylinders and revolve on their axes, leaving the cylinders to pass the water without revolving.

I do not flatter myself that I have nullified all objections which may be raised to the practicability of the above plan. What I have said is by way of suggestion; and having had the subject on my mind for two or three years, I am anxious to relieve myself, by getting the opinion of experimental and scientific mechanics, as to its practicability and probable utility. The same principle, I am inclined to think, may be applied to railroad cars with many advantages.

Very respectfully, yours, &c.

JOHN N. POMEROY.

WHITE MONKEY.—A letter from Ramree of the 15th April, 1827, makes mention of a perfectly white monkey that had been caught there. The hair on the animal's body was white, curly, and soft as silk, and excited great wonder and admiration among the natives. They represented that such a creature had never but once, to their knowledge, been seen in those parts, and that the king of Ava sent down a golden cage, with a host of people, to escort the animal to his presence, and expended besides 20,000 rupees in sacrifices and public rejoicings, auguring from the arrival of the extraordinary stranger, the most happy presages of good fortune. The monkey brought to our correspondent was one of the same description, but unfortunately it was too young and tender an age when caught. A Burmese woman, who was nursing an infant of her own, requested permission to suckle it, and fairly divided her maternal attention between the two. Pug lived in apparent good health and spirits for six days, but whether it was that its nursing disagreed with it, or that it was naturally very delicate, it died on the seventh day.—[Mr. E. G. Ballard, Islington, in the Field Naturalist's Magazine, No. 9.]

PRESERVING EGGS.—A tradesman at Paris asked permission of the prefect of the police to sell, in the market, eggs that had been preserved a year, in a composition of which he kept the secret. More than 30,000 of these eggs were sold in open market, without any complaint being made, or any notice taken of them, when the board of health thought proper to examine them. They were found to be perfectly fresh, and could only be distinguished from others by a pulverous stratum of carbonate of lime, remarked by M. Cadet to be on the egg-shell. This induced him to make a series of experiments, which ended in his discovering that they were preserved in a highly saturated muriate of lime water. They may also be preserved by immersing them 20 seconds in boiling water, and then keeping them well dried in fine sifted ashes; but this will give them a greyish green color. The method of preserving them in lime water has long been the practice in Italy; they may be kept thus for two years.

PRODUCE AND COAL IN PHILADELPHIA.—The following statement exhibits the number of bushels of grain, salt, (coastwise,) and coal, discharged at the port of Philadelphia for the years

	1832.	1833.
Corn.....bushels	631,098½	628,654
Wheat.....ditto	232,831½	156,255½
Rye.....ditto	39,608	77,302½
Barley.....ditto	55,508½	45,760½
Oats.....ditto	95,329	93,434½
Flaxseed.....ditto	5,204½	9,890½
Beans and Peas....ditto	1,414½	378
Clover-seed.....ditto	575	—
Salt.....ditto	114,378	63,971½
Coal.....ditto	142,754	180,145

Flour Inspection.—Amount of flour and meal inspected for the port of Philadelphia, for the year ending 31st Dec. 1833:

Wheat Flour.....	378,590 barrels.
Ditto.....	22,725 hf. ditto.
Rye Flour.....	40,011 barrels.
Corn Meal.....	40,415 ditto.
Ditto.....	7,549 hhds.
Middlings.....	2,587 barrels.

Inspection of Salt Provisions, in the city and county of Philadelphia, for the year 1833:

3,123 barrels of beef.
508 hf. bbls ditto.
6,765 hhds. of pork.
69 hf. bbls. ditto.
53 bbls. of herring.

10,518.

Quantity of *quercitron bark* inspected in Philadelphia in 1831, 1832, and 1833, viz.:

1831—3975 hhds.,	6	tierces,	137	barrels.
1832—2235 "	3	"	159	"
1833—3414 "	1	"	169	"

From a volume entitled "Poems for Youth, by a Family Circle," supposed to be the production of Mr. Roscoe's family, Liverpool.

I'll be a fairy, and drink the dew,
And creep through the honied flowers,
And sleep in the violet's tender blue,
And dance in the evening hours.

My music shall be the soft low gales
Which sigh through the dark green trees,
And heaven's breath swell the gossamer sails
With which I swim the breeze.

The glow-worm shall be my gentle light,
And a lily's cup my bed;
And I'll warm me in the sweet moon-light,
And on fallen roses tread.

And ever fresh the grass shall grow
Around my mystic ring,
And little murmurs, sweet and low,
Shall answer when I sing.

And I will hold a fairy court,
And call each slumbering fay,
And wild and gaily will we sport,
As the twilight fades away.

I'll be a fairy and drink the dew,
And creep through the honied flowers,
And sleep in the violet's tender blue,
And dance in the evening hours.

INOCULATING.—Mr. A. Robinson, in the Northern Farmer, gives an account of his method. He says—

I have found that instead of striking a horizontal, it is best to cut quite a sloping stroke, splitting down from this slope, perpendicularly, so low as to admit the bud, taken off in an oval shape, in the same careful manner as above described; having as much care to preserve a little wood at the eye of the bud as I had in taking it away in the former process. The bud then is to be thrust under the raised bark, down so low as to admit the bark of the stock to come in its former place, above the bud, for half an inch, where it immediately receives its usual nourishment; being bound up with coarse woollen yarn, which I prefer to any thing else. In winding on the yarn I am careful to draw it gently over the wound, omitting to cover the bud till the last, over which I then draw the yarn very softly. In this process, every part works so natural, and so smooth, if unbound the next day it would be difficult to distinguish the bud from a natural one; and, indeed, the bud as well as the bark of the stock seems not in the least affected. In this mode of inoculating, there is no such thing as not taking. On the other hand, the bark being cut square across, and the bud not being sufficiently thrust down, the bark of the stock coming to bear on the outer bark of the bud, at top of the slit, there is nothing to support it; but it dries and shrinks from its primitive place, admits air, and if the wood is taken out of the bud, it all fails together, especially if the eye of the bud is a little rubbed; at any rate, live or die, a dangerous wound is inflicted.

INCREASE OF MANURE BY ROTTING.—It is, we believe, a very general impression that even dry vegetable substances undergo a great loss in rotting, and hence one of the strong and oft repeated arguments of the advocates of long unfermented manures, that 50 per cent. in weight is lost by fermentation, and 50 per cent. in the quality of the remainder. We recommend to their consideration the following extract from an article on the Rotation of Crops, by J. H. Couper, Esq. of South Carolina.

A sufficient amount of manure is yielded to keep the soil in the most productive state, if a stock of animals be kept on the plantation and the dry vegetable matter of the fields be carefully carted to the pens. The expressed cane, tops and leaves, from an acre of cane, yield about 10,000 lbs. of dry vegetable matter. An acre of corn, including blades, stalks, shucks and cobs, about 2500 lbs., when the yield of corn has been 20 bushels:* and the after crop of peas 1000 lbs., together 4500 lbs. An acre of solid peas 2000 lbs. The potatoe vines, pumpkins and turnips, being eat green, contribute only to the production of fluid manure. The total quantity of dry vegetable matter to be applied to the manuring of 16 acres in crop, will therefore be,

4 acres in corn, at 4500 lbs. per acre,		18,000 lbs.
1	" peas and turnips,	2,000
3	" cane, at 10,000 lbs.	30,000
		50,000

which, if merely rotted by rain, will yield 100,000 lbs. of manure; and if rotted by the urine and dung of stock, from 150,000 lbs. to 200,000 lbs.,† or at least 25,000 lbs. of manure to each of the 4 acres proposed to be manured. To this supply of manure must be added from 50 to 70 bushels of cotton-seed from seven acres of cotton to be applied to the four acres of corn; and the peas that are ploughed in, preparatory to the potato crop of vines.

* Mr. Madison estimates the corn-stalk, with its appurtenant offal, at not less than three times the weight of the grain belonging to it.—[Address, Amer. Far. Vol. i. p. 171. See Idem. Vol. iv. p. 404, for Dr. Bellenger's estimate.]

† Three hundred stone of dry wheat straw increased by absorption to 719 stone in seven months. Straw, if simply rotted by moisture from the heavens, will double its original weight; but when rotted by the urine and turnip-fed stock, every ton will yield four tons of manure.—[Sinclair's Code of Agr. ch. iii. sec. 4. 5.]

HORSES AND OXEN.—The following comparison between the expense of a yoke of oxen and a horse at a marketable age is given in the Report of the Trustees of the Kennebec (Maine) Agricultural Society, which we find in the Maine Farmer:

Raising a Horse.		*A Yoke of Oxen.*	
Use of Stud	$4,00	Use of Bull	$2,00
Use of Mare	20,00	Raising Calves	10,00
Keeping first winter	7,00	1st Wintering	12,00
Insurance	1,00	Insurance	50
At 1 year old	$32,00	At 1 year old	$24,50
2d year—Summering	3,00	2d year—interest	1,49
Wintering	7,00	Summering	4,00
Interest	1,92	Wintering	12,00
Insurance	1,00	Tax	33
Tax	50	Insurance	50
At 2 years old	$45,00	At 2 years old	$42,82
3d year—Summering	5,00	3d year—Summering	7,00
Wintering	11,00	Wintering	12,00
Interest	2,71	Interest	2,56
Tax	75	Insurance	75
Insurance	1,50	At 3 years old	$65,13
At 3 years old	$66,38		
4th year—Summering	5,00	Price of Oxen	80,00
Wintering	15,00	Price of Horse	60,00
Interest	3,98	Difference	$20,00
Tax	1,00		
Insurance	1,50	Loss on the Horse	34,36
Shoeing	1,50	Gain in the Oxen	14,87
At 4 years old	$94,35	Difference to raiser	$49,23
Labor equal to breaking.			

BOTS.—Much difference of opinion prevails among farmers, as to the cause of Bots, the manner in which they destroy horses, and the best method of protecting them against their attacks.

The Bots which cause the death of so many horses are hatched from the eggs of a Bee or Insect, which belongs to the Class Insecta, order diptera, genus œstrus. It is affirmed by entomologists that there are two species of the genus œstrus, which deposite their eggs upon horses, but which of the species it is that produces bots, or whether both of them do or not, they are not agreed.

The eggs which produce bots are deposited during the months of August and September, but how they are conveyed to the stomach is also unsettled.

This insect, like others of the same class, passes through different stages. Commencing with the egg, which hatches into a larvæ, which remains in the stomach through the winter, where it continues to increase in size, until the warm weather in the spring, when it passes off with the *fæces*, and changes from its larvæ state to that of the perfect fly, or bee.

It is during the winter or fore part of the spring that these larvæ do the greatest injury to the internal coats of the horse's stomach.

From examination made on the stomachs of horses which have been destroyed by bots, it appears that the larvæ attach themselves to the stomach when small, by their antennæ, or horns, where they continue to increase in size as the season progresses, drawing their nourishment from the juices of the stomach. As the season approaches for their transmutation or transformation from the larvæ to the fly, they become stupid, and let go their hold upon the stomach and pass off with the remains of the animal's food, and from thence into the ground, from whence they emerge perfect insects.

When the number of these larvæ is not great, and the food and exercise of the horse are steady, they do not often affect him; but where the number is great, and the horse is fed irregularly during the last of winter they often prove fatal.

The season when horses are destroyed by bots, in this latitude, is from the middle of February to the middle of May. The remaining nine months in each year there is little danger to be apprehended from them.

Numerous experiments have been made, by immersing them in different substances, after they have been taken from the stomachs of horses, in order to find something which would destroy them, by being given as a medicine, very few of which have ever given any encouragement of success.

During the time that this insect is in its larvæ state, it is covered with a thick, tough skin, which seems to protect it against the effect of any substance which can be introduced into the horse's stomach with safety.

As it is next to impossible to destroy bots in horses, the greatest safety is in making use of such preventives as are found beneficial.

The first step toward preventing bots undoubtedly is, to keep the horse's legs and sides as clear as possible from the nits or eggs of the insect, by scraping them daily with a sharp knife. By doing this the quantity is supposed to be materially diminished.

The next precaution is to keep horses moderately loose in their bodies, and not to make sudden alterations in their food, nor to treat them in any manner that would have a tendency to render them inclined to fever.

The articles most recommended to be mixed with their food are lime and ashes, either of which, if given in small quantities, during the three months when they are troublesome, are said to be efficacious. Salt is highly recommended by some, who suppose that, if a horse is salted once or twice each week, it will prevent his being troubled.

The manner in which bots operate, is by destroying so much of the inner coat of the stomach as to produce inflammation, or by collecting either at the upper or lower end of the stomach, and obstructing the common passage of the bowels; cathartics are to be recommended.

A late English writer on the diseases of horses says, "when bots fix themselves on the sensible portion of the stomach they may do no harm; *but no medicine that we know of will destroy them.*" Another English writer on this subject says, that bots are generally attached to the insensible part of the stomach, and that while remaining there they produce health rather than injure it. Blaine, as well as most American writers, recommends common salt as one of the best preventives against inflammation from bots, and says it should be given daily.

Treating the disease by bots as an inflammatory complaint, undoubtedly is the course most beneficial, and will come under the same management as other inflammations of the bowels. The same causes that produce ordinary inflammations of the bowels are also liable to produce inflammation from bots, and these are—over-exertion, after which the horse is allowed to stand exposed to cold; poisonous substances mixed with food: but the most fruitful cause is the change of food. Perhaps there are more cases of inflammation produced by this last cause than all others.

Whatever is used as cathartics in cases of inflammation caused by this larvæ in horses, they should always be accompanied with gruel, boiled starch, flax-seed tea, or some thing of the kind, to prevent irritation; and the animal treated in every respect as for an inflammation of the bowels, without any regard to its being caused by bots, and no medicine should be given in the one case which would not be proper in the other. The whole course to be pursued may be summed up in a few words: first bleed, give physic, follow it with mucilaginous drinks, keep the animal warm, and if he recovers, feed moderately for several days.—[Goodsell's Farmer.]

CURE FOR THE BOTS OR GRUBS IN HORSES.—If you will excuse the subject, (*for although graceless*, it is valuable not only to agriculturists but to all classes, using that valuable animal the *Horse*,) I send you a remedy I used while our coals were brought to market in road waggons, which obliged us to use a great number of horses; and I never knew it fail of

giving relief, in from one to five minutes, viz.: Pour out half a gill of spirit of turpentine into the hand, and rub it on the breast of the horse while suffering; let it be applied to the hallow or pit of the stomach, just at the point where the neck joins the breast, on a space six to eight inches in diameter. The relief is certain, if the grubs have not already cut through the coats of the stomach.—[Farmers' Register.]

Cure for a Film in the Eye of a Horse or Ox.—Edward S. Jarvis, Esq. of Surry, Me. in a letter to Mr. Joseph R. Newell, proprietor of the Boston Agricultural Warehouse, states as follows:

Have you ever heard of a cure for a film on the eye of a horse or an ox? I was told of one eighteen or twenty years ago, and have been in the practice of it ever since with perfect success. It was brought to my mind by just having had a proof of its successful application in a calf that had its eye hurt by a blow from another creature. A film formed over it, and it was thought its eye was lost. But by turning into the opposite ear a great spoonful of melted hog's fat, it was cured in 24 hours. I do not pretend to account for this, but I have seen it tried with success so often, that I think it ought to be made public, if it has not been before. I learned it of an Indian.

Remarkable Oat Plant.—Mr. Fessenden: I send you the stalks produced from one oat. There are 140 stalks, and from one stalk, at the time of reaping, 330 oats grew. The height of the oats was 5 feet 2 inches. This was raised on new land, in Township No. Four, in Oxford county, state of Maine, last season. E. Adams.

The roots and clusters of the lower part of the stalks of the above-mentioned vegetable phenomenon may be seen at the office of the N. E. Farmer.

Purifying Cider.—*Mr. Editor:* It has often been asked me, what is the best method of purifying and preserving cider? What is the best way of fermenting and distilling cider? And again, of rectifying cider whiskey; also what is the best use to apply the apple pumice after it is pressed? To all the above questions I could give but little satisfaction from experience, and still less from the perusal of what numbers I received of the New-York Farmer; perhaps some remarks on the above might be useful to your readers; to me, at least, it would be a treasure, as the season for applying useful methods is fast approaching. I will make some experiments next fall which you shall have for publication if required. Beach shavings is said to purify or clear cider.

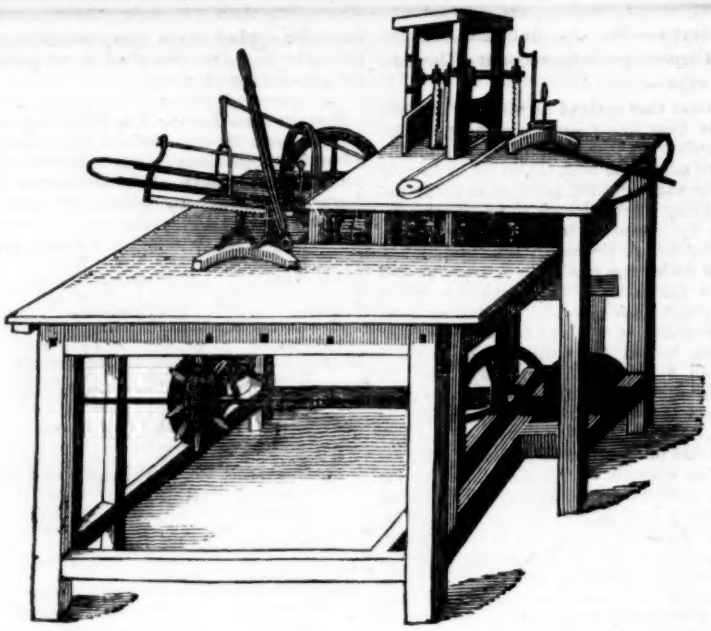
Your friend, J. Williams.

Argyle, March 7, 1834.

Remarks.—Ordinarily when cider is well drained at the cider-mill, it will seldom require purifying. There are numerous methods of refining this liquor. In the Farmers' Library we find the following directions. Take the white of six eggs, with a handful of beach sand washed clean, stir them well together: then boil a quart of molasses down to a candy, and cool it by pouring in cider, and put this together with the eggs and sand into a barrel of cider, and mix the whole together. When thus managed the cider will keep for years, and have a fine amber color.

Mixing of Vegetables: *Mr. Fleet,*—I would ask Mr. Robinson and Mr. Thomas Bridgeman whether it is not possible that the ferina, fecundating the beets and carrots, may not have travelled, heaven directed, to their beans and carrots, as in the case of the paper mulberry and corn. It is well known that beans and carrots are very apt to mix; but I think not by their roots. Yours, R. M. W.

Potter, March 1st, 1834.



Hamilton's Sawing and Boring Machine.—This machine is designed for sawing and boring wood or timber, and is claimed by Colonel Hamilton in his specification to be "*an improvement in the mode of sawing felloes of wheels, circular and curved segments*, mitre joints, tenons, and also boring of felloes and hubs of wheels;" and generally for sawing circular, curved, and plain surfaces.

The machine is propelled by a two horse power steam engine. Animal or water power may be applied for the same purpose. The particular form required is sawed out of the timber with perfect accuracy and great expedition, by means of one or more thin narrow saws moving up and down. There is also belonging to this machine a horizontal saw for cutting segments of circles their proper lengths, and with proper inclinations for joints, tenons, &c. &c. Hubs of carriages are bored with perfect precision. All these operations are effected by the changing position of the material, accommodatlng itself as it comes in contact with the saw or auger, so as to receive the exact form, inclination, &c. required. Every thing is done, without marking or laying out, with mathematical accuracy by means of scales, which are distinctly laid down on the machine.

The machinery which guides and steadies the material in its movements may be readily varied, so as to form segments of wheels of greater or less dimensions; and the boring may also be more or less inclined. The scale indicates the exact position which the part of the machine that guides the material required to form a wheel,—for instance, of greater or less circumference. Slats and legs of chairs may be made of various lengths, and thicknesses, and shapes, as fashion or utility may dictate.

This machine affords a happy specimen of labor saving, and may be advantageously applied to a variety of useful purposes. It occupies but little space, only a part of a small room. No skill is required in using it. A mere laborer, or a boy, can learn in a few hours to use the machine, and to produce the article as perfect as the most skilful machinist. Like many other labor saving machines, it performs that part of the labor which the accuracy and strength of the human hand are incompetent rapidly, and with precision, to perform; it, in fact, does the work which is the most difficult and toilsome to the laboring manufacturer.

The expedition with which materials of small value, and with very little waste, are converted into articles of comparatively much greater value is entitled to particular notice. Chair backs sawed from our native curled maple are worth from *eight to twelve and a half dollars* per hundred.

By the aid of this machine, which costs only about *three hundred dollars*, a common laborer may do the work of twenty or thirty mechanics. The merit claimed by Colonel Hamilton consists chiefly in the facility and accuracy with which the material is adapted to the saw, so as expeditiously and uniformly to produce the exact form which is wanted.

Asparagus.—There are several varieties of the garden asparagus, as the large German, the red and green topped, the Battersea, Dutch, large Reading, &c. The large German red, and green topped, are considered preferable.

Asparagus is propagated from seed, but is often increased by offsets from the old roots. Beds are thought to succeed best when set with young seedling plants; but the shoots will not be ready for use as soon as when set with offsets. The seed should be sown early in May, on a bed of light rich garden soil.

They may be sown quite thick, and allowed to grow in the bed one summer.

In the fall, or early in the spring, a bed should be formed in some part of the garden, where it is intended it shall remain, by trenching it eighteen inches deep, and mixing with a suitable quantity of manure. Some prefer beds of only two and a half feet wide, calculated for two rows, set at eighteen inches distant; others form their beds four feet wide, and set three rows at the same distance. But of whatever width the beds are made, the roots should be placed at least eighteen inches distant from each other, and should be placed nearly on a level with the walks between the beds. After the roots are placed upon the

beds they should be covered over about four inches deep with fine loose mould. The first year after setting, asparagus should be allowed to grow without cutting, and in the fall, after the frost has killed the tops, they should be cut off, and the bed covered over three or four inches thick with stable manure. In the spring following, the manure should be made loose with a fork, but allowed to remain upon the bed, that the young shoots may be blanched a greater length. The soil and litter should ever be kept six or eight inches thick over the crown of the roots. When good strong plants are set they will produce shoots fit for cutting the second year after setting. The young shoots may be cut until the middle of June, after which they should be allowed to grow up for seed. In selecting plants for setting, none should be used which have not a good crown or bud, as the lateral roots, or those destitute of buds, will not sprout, although they will remain in the ground many years without rotting.

In cutting asparagus, care should be taken not to injure the buds upon the crown, which are close to the lower end of the shoot; for this purpose a knife with a narrow point should be used, which should not be allowed to go as deep as the buds. When a bed of asparagus is well planted, it will continue to produce well for twelve or fifteen years, and when it is found that the shoots decrease in size, a new bed should be formed before the one is taken up, that the family may be constantly supplied with this wholesome vegetable.—[Goodsell's Genesee Farmer.]

Canker Worms.—Mr. Goodsell: Permit me, through the columns of your paper, to communicate a simple and easy method of destroying the effects of that great enemy to our orchards, the canker worm. Six years since, while walking in the forest and examining the capsules of the Castanea Americana, or chesnut burr, the idea struck me that they might be applied to advantage in preventing the effects of the canker worm. I took a piece of strong twine and sail needle, and made a band of them, placing all the backs one way, which caused the spines to project in all directions; I tied it round the trunk of an apple tree in the centre of an orchard that was much injured the year before, which bore abundantly without the leaves being injured in the least, while those around were all ruined for that year.

I have since tried it several times with entire success. A set of bands will last many years if taken off when the insects have done ascending, and secured in a dry place. I have usually put the bands on the trees about the middle of March.

In sections of the country where chesnut burrs are not easily obtained, I would recommend the use of the dipsacus fullonum, or fuller's teasel; although I have never tried it, I have no doubt it would make a sufficient barrier to prevent the ascent of the canker worm. Nathan Ruggles. New-Haven, (Ct.) Feb. 26, 1834.—[Goodsell's Farmer.]

Grafting and Setting out Trees in the same Season.—In the spring of 1830, I bought thirty trees of a different size to set in my orchard. In digging up the thirty large ones, we dug up a considerable number of small crooked things that were not worth any thing to the owner; I therefore obtained about sixty from the nursery. They were of all sizes, from the bigness of a pipe-stem to that of a man's thumb. I carried them home and put them in a barn. The next day being rainy, I went to work and grafted them. As soon as it was fair weather, I had them set out in rows, each kind by itself. The result was, that upwards of fifty grew and did well. The large ones were set out, and I engrafted them; some the same day, and some a few days after, and they did as well as any scions that I ever set.

Let trees be properly set, and I would then graft them and warrant them as cheap as I would any trees whatever. Z. Sargent. Gardiner, March 2, 1834.—[Maine Farmer.]

To destroy Vermin with Rum.—Mr. Editor: Many persons ask, "what shall we do with it?" when we persuade them to abandon ardent spirits. I answer, destroy your enemies with it. The house of an inn-keeper of my acquaintance was very much infested with vermin; he resorted to many different methods, but could not destroy them; at length he thought of the effect ardent spirits had upon his two-legged customers, and he resolved to make an experiment. Accordingly, he prepared a pan of black-strap [rum and molasses], set it in the cellar and waited the event. The next morning he found fourteen large rats lying helpless around the pan. It is needless to add, he pursued this device until his house was cleared of rats and mice.

A farmer's corn was much annoyed by a bear, which he was not able to destroy until he thought of rum. He procured a vessel of well sweetened rum, and the next morning bruin was too rich and happy to go or stand. A few have found that corn, strongly saturated with rum, will take away the use of leg and wing from crows. One old farmer told me last summer that grasshoppers loved it too. Now I say, neither throw away nor burn ardent spirits, nor, for conscience' sake, murder human beings with it—but destroy grasshoppers, bears, and crows. Foxes, I presume, are too cunning to drink it. A. B. N.—[Vermont Watchman.]

Acclimating Grain.—Sir Arthur De Capell Brooke, in his travels to the North Cape, states, that grain is sown and reaped within the space of six or seven weeks, in Norway and other parts of Europe; and that the heat in summer is there equal to what is often felt in the West Indies. This fact may excite our wonder. But it appears less surprising when we consider that in those Northern regions the warm influence of the sun is constantly promoting vegetation. The inhabitants have a *long day*, and scarcely any night, for a considerable length of time. Nature wisely orders all things. Vegetation is according to the climate; and many kinds of vegetables will become acclimated. This is the case with corn. It is, therefore, of no great use to procure seed corn from the northern or southern climates, as it will ultimately conform to our climate. That which is grown here is best adapted to our own soil and climate; but too much attention cannot be paid to the selection of the best seed. For a light sandy loam, not highly manured, corn of a smaller size is best adapted. The large kind of corn requires a deep and very rich soil. As our seasons most favorable for corn cannot be foreseen, it may be wise policy for farmers to plant some portion of their corn, which will probably ripen before the early frosts. Z.—[Northern Farmer.]

Manures.—The editor of the New-York Farmer has published several valuable papers on the subject of manures, in that periodical, in which he has maintained that the practice of applying rotted manures is better supported by science, than that of applying them in a fresh and unfermented state. In the number for March he has published an article from the Edinburgh Quarterly Journal of Agriculture, which condenms entirely the theory of unfermented manures, first introduced by Sir Humphry Davy, and which that distinguished chemist believed to be incontrovertibly established on scientific principles. The article alluded to draws many arguments both from the principles of science and the practice of agriculturists, which seem, to say the least, to render doubtful the accuracy of Sir Humphry's theory. Which of these conflicting theories is the true one, is a question which farmers have a deep interest in having speedily and correctly settled; this however can probably be done only by a long course of careful and accurate experiments.

We intend to publish the article referred to, that the grounds of Sir Humphry's theory may be re-examined; and we hope it will be the means of a course of experiments which will thoroughly test its correctness.

Is fresh unfermented manure injurious to vegetation? The article in question asserts that practice has proved it to be so, from the quantity of ammonia which it contains—that fermentation drives off the acrid ammonia; and tho' much of the carbonic acid gas is also evolved, the manure is not injured, as its value depends less on the quantity of this principle than on that state in which the manure most readily communicates this gas to plants. —[Northern Farmer.]

Nursery Fruit Trees.—It would seem, by the following, that disappointments occur in Britain as well as in this country.

Robert Lockhart, Esq. of Castlehill, ordered, some years ago, several hundred of pear-trees, of the best kinds, and planted them on rich land, in front of Camnethan Priory. The trees grew well; but when they began to show blossom, and yield fruit, about eight years after they were planted, he found, that instead of the rich well-flavored pears he had ordered and expected, the whole of them were of the kind known in Lanarkshire by the name of "*pear-devil*," the worst of all pears. He of course instantly cast them out, as cumberers of the ground.

To make Maple Sugar.—It has been customary to cut a gash in the tree, from which saccharine liquor flows, or to bore a hole, and put in a reed, and, when the liquor ceases to flow, plugging up the hole. Both these methods are injurious, and tend to destroy the tree. In the latter case, the tree roots round the plug to some distance within. The following method is proposed in lieu of these, and has been successfully practised in Kentucky. At the proper season for running of the liquor, open the ground and select a tender root, about the size of one or two fingers; cut off the end, and raise the root sufficiently out of the ground to turn the cut end into the receiver. It will emit the liquor from the wound as freely as by either of the other methods. When it ceases to flow bury the roots again, and the tree will not be hurt.

Stains by Fruits are readily removed from clothes by wetting them, and placing them near lighted brimstone; a few matches will answer the purpose.

CONTRADICTORY STATEMENTS IN AGRICULTURAL PAPERS.—Many persons condemn or approve, from a few common and ostensible circumstances that strike every mind, without taking the trouble to reflect and investigate. The following sentiments from the Farmers' Register accord with our own views.

A friend and highly esteemed correspondent, alluding in a private letter to such contradictions, (in various matters,) says, "though I am as willing as any body to believe what I wish to be true, these contradictory statements make me much of a sceptic in regard to every thing I either hear or read; and I am confident they have the same—perhaps, a greater effect—upon other people. The inevitable consequence is, to aggravate the senseless prejudices against what is called 'book farming,' which prejudices it is the duty of all the real friends of husbandry to counteract."

We are well aware that the many contradictory and erroneous opinions which are presented in agricultural journals furnish a subject for ridicule, and cause many to decry these periodicals. We deny, altogether, that such censure is well founded—and maintain, that a journal of this kind would be faulty, and wanting in usefulness, if it did not exhibit the contradictions in opinion that exist, however false one side (or perhaps both) may be. If there were no such publications, these discordant opinions would not the less exist—and for want of the means for communicating and comparing them, the most erroneous might be received, and acted upon, for a century. An agricultural journal does not create, but simply makes known such contradictory opinions and statements—and by making them known, and inducing discussion and experiment, serves, soon or late, to dispel errors, and establish truth. Even if the editor of an agricultural journal was so highly gifted as to know which opinions were false in all such controversies, he would not, by refusing them publicity, aid either the establishment of truth, or extension of correct agricultural practice. And if he presumed to make the attempt, with no better powers of discrimination than we possess, the true opinion would often be excluded for the false. Provided therefore that false statements are not intentionally made, a periodical like the Farmers' Register will best attain its object by drawing forth all opinions that have extensive influence and operation, however contradictory they may appear.

FOSSIL MANURE IN NORTH CAROLINA.—It is enough to make the heart of the patriot bleed, when he reflects what North Carolina is, and what she is capable of being. With every thing in the way of resources, physical and moral, to make her a great, commanding and prosperous state—she is at best but stationary, and which you know is comparative declension. Her population and wealth are deserting her in one continued and augmenting stream, for other climes. And why? Simply because she will not improve the means which the God of Nature has placed at her disposal. Internal improvement is at present a more urgent want with us, than the improvement of our soils. Millions of our resources are lying dormant, for the want of facilities for transportation. Let me offer a single illustration, applicable exclusively to the eastern section of the state. The pine-trees, (long leaf,) of North Carolina, for lumber and naval stores, are unquestionably of greater value than her slaves, if they could be made available. I have been informed upon the best authority, that 20 per cent. can be cleared on the capital embarked in making turpentine, when convenient to market. But for the want of this convenience, this immense resource can only be called into action on small portions of our navigable streams. I travelled a few days ago from Waynesborough to Fayetteville, a distance of sixty-five miles, through a country heavily timbered with the finest long leaf pines, and saw no evidence during the route of their being used for any thing but plantation purposes. I should except one tar kiln and half a dozen trees designed for tar timber, partly hewn and left to decay—but not one stroke of the axe for turpentine. Hundreds and thousands of acres are in the state that nature formed them. This is but "*e pluribus unum*," to show how profoundly the giant sleeps. But I am trespassing to much of your patience, and will force myself too a conclusion. Yours, &c. ISAAC CROOM.—[Farmers' Register.]

BEST TIMES FOR REMOVING LAURELS, &c.—Evergreens, if taken up carefully, may be planted with success at all seasons. About eight years ago, I superintended the planting of some very large ones, consisting of Portugal, and Common Laurels, Cedars, &c., in the month of July, when the weather was very dry, at Sulby Hall, Northamptonshire, the seat of Geo. Payne, Esq., which did remarkably well. If, however, the situation be dry, and the soil light and sandy, they will in general, with the exception of hollies, do best, if planted in November or December, providing the weather be mild. On the other hand, if the soil be low and retentive of moisture, they thrive best if planted in May. In both cases, it is indispensably necessary that all large plants be taken up with large balls, the roots being as little damaged as possible. S. H.—[Hort. Register.]

SUBSTITUTE FOR HOPS.—I was highly delighted in finding so much in the Register calculated to interest ladies. My wife remarked the other day, that she had got fully the worth of the subscription already. I trust you will, in every number, have an eye to that; and as I have lately become acquainted with a fact which may be convenient to them at some period, I will briefly mention it on this occasion, and if it be indeed new to you, (as it is to me,) you can use it for the interest and instruction of the ladies, if you see cause. It is the substituting the Life Everlasting (the botanical name I do not know,) for hops, in making yeast.

The yeast is made of the dried leaves and flowers just as yeast is made of the hop, and used in the same way. I am informed by those who have used it for some time, that bread is not as apt to become sour, and the flavor is finer than the hop bread. I have no doubt its qualities would be greatly improved if it were cultivated, and the leaves and flowers gathered as soon as they were ripe, and dried in the shade.—[Farmers' Register.]

EXPORTS FROM IRELAND TO ENGLAND.

In the years	1790.	1830.	Rate.	£
Oxen	19,319	60,000	200s.	600,000
Sheep	—	70,000	40s.	140,000
Swine	5,636	80,000	70s.	280,000
Horses	2,063	2,500	201s.	50,000
Bacon & Hams, cwt	17,026	380,000	42s.	798,000
Beef & Pork, bbls	88,583	150,000	65s.	487,500
Butter, cwt	198,149	450,000	80s.	1,800,000
Wheat, qrs	41,616	525,000	50s.	1,312,500
Oats, do.	235,015	1,697,000	20s.	1,697,000
Spirits, gallons	3	634,000	7s. 6d.	256,500
Linen, yds	30,410,840	50,000,000	2s.	5,000,000
Cotton, do.	—	6,000,000	6d.	150,000
Fresh Butter, Fish, Potatoes, and sundries, per steamers				1,000,000
				£13,571,500

Comparative Duties that would be payable if imported from other countries.

Oxen at 5*l*.	£300,000
Sheep at 10s.	35,000
Swine at 15s.	60,000
Horses at 5*l*.	12,500
Bacon, &c. at 15s. per cwt.	285,000
Beef 20s. per barrel	150,000
Butter 20s. per cwt.	450,000
Wheat 20s. per quarter	525,000
Oats 5s. do.	424,000
Spirits 2s. 6d. per gallon	85,000
Linen and Cotton 6d. per yard	1,500,000
Sundries 25*l*. per cent.	250,000
	£4,076,500

FIELD FLOWERS.—*By Thomas Campbell.*

Ye field flowers! the gardens eclipse you, 'tis true?
Yet, wildings of nature, I doat upon you,
For ye waft me to summers of old,
When the earth teemed around me with fairy delight,
And when daisies and buttercups gladdened my sight,
Like treasures of silver and gold.

I love you for lulling me back into dreams
Of the blue highland mountains and echoing streams,
And of broken glades breathing their balm,
While the deer was seen glancing in sunshine remote,
And the deep mellow crush of the wood-pigeon's note,
Made music that sweetened the calm.

Not a pastoral song has a pleasanter tune
Than ye speak to my heart, little wildings of June:
Of old ruinous castles ye tell,
Where I thought it delighted your beauties to find
When the magic of Nature first breathed on my mind,
And your blossoms were part of her spell.

Ev'n now what affections the violet awakes;
What loved little islands, twice seen in their lakes,
Can the wild water-lily restore;
What landscapes I read in the primrose's looks,
And what pictures of pebbled and minnowy brooks,
In the vetches that tangled their shore.

Earth's cultureless buds, to my heart you were dear,
Ere the fervour of passion, or ague of fear,
Had scathed my existence's bloom:
Once I welcome you more, in love's passionless stage,
With the visions of youth to revisit my age,
And I wish you to grow on my tomb.

What can we reason but from what we know.—[Pope.]

SLAVERY.—*Mr. Fleet:* Many years ago I was riding through the pine barrens of Evingham County, Georgia, and met three children from six to twelve years of age quite naked; they skulked and run; I followed a few rods and came to a pen about nine feet high by sixteen square, on which was no roof. In one corner were some rice, straw and blankets, and some barks laid over it to keep off the rain; the only furniture I observed was a broken hoe used to make hoe-cake. A white woman about thirty years of age, apparently in good health, appeared; on being told that I thought the children were lost, &c., observed—O dear sir, they were not lost, they are used to it; you might as well think of losing our oppossum or a cooter on the pine barrens as these children.

The incident furnished me matter of reflection for the remainder of the day. This, then, said I, is the fruit of slavery! In the south, where slavery is fashionable, it is considered disreputable for white people to work, and if they do not own slaves they are generally naked, poor, and mischievous. Place a man on the moss-grown rocks of New-Hampshire or Nova Scotia, and he will work six days in the week; remove him to western New-York, and he will, perhaps, work four; remove him to Illinois and Missouri, he will, perhaps, work two days; remove him again to Louisiana or Georgia, where slave labor is plenty and the climate mild, and he will not work at all. It appears then that man wants the stimulus of necessity to make him industrious, and none I believe can estimate the evils of slavery without having seen its effects upon the industry and habits of community. RATIO.

March 10th, 1834.

EDUCATED MEN: *Mr. Fleet,*—I remember a conversation had with a man some years ago: he contended that learning was a dangerous thing; he had two sons, and would give them no education lest they might be counterfeiters and rogues. The one is an ignoramus, and no better than he should be; the other is a confirmed drunkard, and there is no little villany but what they are capable of.

The remark of Seneca, that "when learned men abound good men are scarce," may have been true in his day; but as a general rule, I cannot agree with him. Let the mind be cul-

tivated, its reasoning powers developed, and the affections will be generally good. True, such a man will hardly believe the stories about Jupiter, Juno, Apollo, Mars and Bacchus; but in general, his moral conduct will be exemplary. The cultivated mind cannot but see a great First Cause, and perceive that his attributes are Goodness, Mercy, Beneficence and Justice, and will be inspired as far as a finite being can, to imitate an infinite one in his perfections. So I believe. RATIO.

March 1st, 1834.

CORN-SHUCK MATTRESSES.—As the laudable object of the Farmers' Register is to diffuse as widely as possible the mass of knowledge which relates to domestic economy, thereby procuring for the many the comforts which are at present possessed by the few; I take peculiar pleasure in aiding the benevolent design, so far as the narrow limits of my own information extend: and so, methinks, should every matron whose experience has surmounted the perplexities of household cares. For this purpose, I have deemed it of some importance to call the attention of its readers to the use of shucks in making mattresses. I have often been surprised to find shucks so rare in families, where every convenience was at hand to make (with the most inconsiderable expense) this article of comfort and utility.

Nothing but a little management is required for every farmer's family in the state to possess them. Independent of the comfort of mattresses in summer, I have often heard experienced physicians plead hard for their general use in this bilious climate; though common sense, I should suppose, is sufficient to discover the relaxing and debilitating effects of being nightly smothered on a feather bed, through the heat of summer; and the increased suffering produced by their use, during the prevalence of fevers, incident to our climate.

For my own part, I have often suffered painful regret, as I have looked on the sick beds of the poor, where the possession of a hair mattress would be a luxury next to an impossibility for them to obtain; but I am happy to say, that the discovery of the use of backled shucks obviates all pecuniary difficulties, in the farmer's case at least.

There are few families in Virginia, where there are not some slaves, incapacitated by age or decrepitude for active labor; and since the bright era, which introduced the cotton gin, to supersede the use of fingers in *picking cotton*, they are thrown out of employment altogether; or have little else to do than to sit and stupify in the chimney corner. Now, for the benefit of all parties, I would recommend that a plenty of shucks, a flax hackle or common fork, and a barrel, should be conveniently arranged for the occasional exercise of the subject's faculties, until a sufficient quantity is shredded and packed up. When you have prepared your tick, and the weather is suitable, immerse and soak the shucks well in clean water, and then spread them thin in the hot sun to dry. This will cause them to curl and acquire the elasticity of hair. Be careful after hackling every bunch, to cut off the hard ends.

These shucks stuffed in a common tick, and tacked in squares through and through, will be quite comfortable on a feather bed, where cotton cannot be afforded—but if a case is made after the mattress style, and batts of carded cotton laid at the top and bottom, of several thicknesses, and neatly tacked in squares, they may be made to equal, if not surpass any hair mattress, for you can have them as thick as you choose; and in neatness and purity of material, they will surpass, the hair, though they may not in durability. I should think it a useless or presumptuous display of my own knowledge on the subject, to describe farther the process of making mattresses, but that I was told by an intelligent young housewife, that she had no idea how they could be conveniently completed. As I shall, in such dilemmas, ever feel it a delightful task to assist the *young idea*, I will merely suggest, that the piece which divides the top and bottom of the mattress case should be sewed all round the bottom, and bound with tape made for the purpose. The top part should be sewed to one side of this piece only, like a lid to turn back, until the batts of corded cotton are laid on the bottom of several thicknesses, and the shucks carefully and regularly packed in.—Place the layers of cotton again over the shucks, and turn the lid over all, and bind it round like the bottom. It must be then laid on a frame, for the purpose of tacking it through and through. This will require a very long needle, which can be made at any blacksmith's shop.—A FRIEND TO COMFORT. February 20th, 1834.—[Farmers' Register.]

ARABIAN HORSE.—Perhaps the most remarkable point about the Arabian horse is the extraordinary smallness of the head and mouth,—so small, indeed, is the latter that you would think they might use a common tumbler for a water bucket.

EVERY NERVE APPROPRIATED TO ITS FUNCTION.—From this law of our nature, that certain ideas originate in the mind in consequence of the operation of correspondent nerves, it follows—that one organ of sense can never become the substitute for another, so as to excite in the mind the same idea. When an individual is deprived of the organs of sight, no power of attention, or continued effort of the will, or exercise of the other senses, can make him enjoy the class of sensations which is lost. The sense of touch may be increased in an exquisite degree; but were it true, as has been asserted, that individuals can discover colors by the touch, it could only be by feeling a change upon the surface of the stuff, and not by any perception of the color. It has been my painful duty to attend on persons who have pretended blindness; and that they could see with their fingers. But I have ever found that by a deviation from truth in the first instance, they have been entangled in a tissue of deceit; and have at last been forced into admissions which demonstrated their folly and weak inventions. I have had pity for such patients, when they have been the subjects of nervous disorders, which have produced extraordinary sensibility in their organs—such as a power of hearing much beyond our common experience; for it has attracted high interest and admiration, and has gradually led them to pretend to powers greater than they actually possessed. In such cases it is difficult to distinguish the symptoms of disease from the pretended gifts which are boasted of. Experiment proves, what is suggested by anatomy, that not only the organs are appropriated to particular classes of sensations, but that the nerves, intermediate between the brain and the outward organs, are respectively capable of receiving no other sensations but such as are adapted to their particular organs. Every impression on the nerve of the eye, or of the ear, or on the nerve of smelling, or of tastes, excites only ideas of vision, of hearing, of smelling, or of tasting; not solely because the extremities of these nerves, individually, are suited to external impressions, but because the nerves are, through their whole course, and wherever they are irritated, capable of exciting in the mind the idea to which they are appropriate, and no other. A blow, an impulse quite unlike that for which the organs of the senses are provided, will excite them all in their several ways; the eyes will flash fire, while there is noise in the ears. An officer received a musket ball which went through the bones of his face: in describing his sensations, he said that he felt as if there had been a flash of lightning, accompanied with a sound like the shutting of the door of St. Paul's. On this circumstance, of every nerve being appropriated to its function, depend the false sensations which accompany morbid irritation of them from internal causes, when there is in reality nothing presented externally; such as flashes of light, ringing of the ears, and bitter tastes or offensive smells. These sensations are caused, through the excitement of the respective nerves of sense, by derangement of some internal organ, and most frequently of the stomach.—[Bell's Bridgewater Treatise.]

OPPOSITION OF IGNORANCE TO THE USE OF PRINTING.—In the 'Typographical Antiquities' of Ames and Herbert, it is stated that the first book printed on paper manufactured in England came out in 1495 or 1496, from the press of Winkin de Worde. Shakspeare—whose chronology is not to be trusted—makes Jack Cade, in the reign of Henry VI., (who was deposed in 1461,) thus accuse Lord Sands: "Whereas, before, our forefathers had no other books but the *score* and the *tally*, thou hast caused printing to be used, and, contrary to the king, his crown, and dignity, thou hast built a paper-mill." The insurrection of Jack Cade was ostensibly for the redress of grievances amongst the people. Shakspeare fixes the complaint of Cade against printing and paper-making some ten or twenty years earlier than the introduction of printing amongst us; but he could not have better pointed out the ignorance of popular violence,—and all violence is the result of ignorance. The best instruments for producing good government, and equal laws for all men, have been the paper-mill and the printing press; and exactly in proportion as the knowledge which they embody has been diffused, have we advanced, not only in our social arrangements, but in every other manifestation of a prosperous and well ordered community. Whatever remains to be accomplished will go hand-in-hand with the continued diffusion of knowledge.

SHALLOW PLOUGHING.—I haul out my coarse manure and scatter it on the land, where it is most stiff and close and then use a one or two-horse turning plough to plough the manure in, but am careful not to break the land more than three or four inches deep. I then haul out my fine manure on another part of my cotton land, and let it remain in ox load heaps, till I can finish ploughing the land with the same turning plough, or a trowel hoe plough, as I may find most convenient, and then scatter the fine manure, and harrow it in with a five-tooth harrow.—[Farmers' Register.]

ANALYSIS OF OYSTER SHELLS.—One hundred grains of oyster shell will give Carbonate of Lime, 95.18; Phosphate of Lime, 1.88; Silex, 0.40; Water, 1.62; Insoluble animal matter, 0.45; Loss, &c. 0.46. From this view of the composition of recent oyster shell, it is obvious that no appreciable advantage can be expected in applying it as a manure, from the minute proportion of animal matter which it has been shown to contain. It is as a carbonate of lime, and that nearly in a state of purity, that it should claim the attention of the agriculturist.—[Farmers' Register.]

SUMACH BERRIES.—I think you will be interested to learn that in an examination of the berries of the Sumach (Rhus Glabra,) with which I have been for some time occupied, I have discovered a vegetable acid of properties so peculiar, as I think will entitle it to be regarded as new. It exists in the juice in large quantities combined with lime, forming a compound of great beauty when purified and crystalized, and of a very agreeable acid flavor.—[Pro. Rogers, in Farmers' Register.]

REMOVAL OF A STEEPLE.—The Genoa Gazette contains an account of the removal of a church steeple entire, at Crescentino, in Piedmont, from one point to another, at several yards distance, where it was placed on a new foundation. The master mason was so confident of success that he made his son remain in the steeple ringing the bell during the operation.

ON THE CULTURE OF THE GARDEN BEAN.—I have been very successful for half a dozen years in obtaining two crops of beans from the plants. In the summer of 1826, my first crop of magazin and early long pod beans was by a very strong and violent wind blown down; this was done when the beans were in full blossom. The crop from the blossoms which the plants then possessed was very fine and abundant, and gathered during July. In three weeks after, the beans were prostrated, each stem pushed forth from near the root one or more, in some instances four to six, fresh stems; these bloomed freely, and produced an abundant crop, which were gathered during September. Since that grew, I have uniformly bent down, so as to break the stalk near the root, my first and second crops of beans; I have by this means obtained four crops of beans from two sowings, and which supplied me from July 1st to 31st October. By this method only half the seed was required which I had been accustomed to use, and the greatest advantage to me was, that only half the ground was required, so that my advantages by this method are four-fold. I always pinch out the tops when the plants are in full bloom; this throws the vigor into the production of fruit instead of a continued increase of stem and foliage.—[Cobbett.]

CANADA THISTLE.—Mr. Goodsell: Having seen a communication in your paper, over the signature C., dated Woodland, December 16th, 1833, recommending, as the most sure method of extirpating the Canada thistle from our soil, "to plough the ground, and sow it with large red clover, which he recommends to have mowed the first and second years without feeding it, after which the land may be ploughed, and sowed with wheat, when it will be found that the roots of the thistles are perfectly destroyed, so far as regards vegetation." Having myself practised a method very similar with complete success, I was forcibly struck with the propriety and accuracy of his remarks. I cannot account for the destruction of the thistle in this case, otherwise than that the clover grows earlier, and more luxuriantly than the thistle, and by overshadowing it, the thistle is kept in a dwarfish and sickly state, until the clover is mown, at which time the stalks of the thistle will be found hollow, and having a whitish, sickly appearance, and they will not immediately send up young shoots, unless the clover is fed off. It is advisable to mow them in a warm clear day, and remove the crop immediately, that the sun may shine directly upon the emaciated stalks, which will not only retard their growth but accelerate their destruction. I have written the above as the result of my experience, and feel confident that any person who is troubled with Canada thistles may adopt the course recommended by your correspondent C. without fear of disappointment, and that he will find his communication generally correct. JOSEPH EDDY. Williamson, March 4, 1833.—[Goodsell's Farmer.]

LIVE STOCK IN ROSS COUNTY, OHIO.—The amount of pork put up in this county during the year is about 20,000 barrels, worth about $10 per barrel, besides a considerable amount which was driven to the eastern markets on foot. About 3000 head of fat cattle were sold to purchasers for the eastern markets, worth about $4.50 per hundred. There was manufactured in Ross county about 40,000 barrels of flour, worth $3.50 per barrel. This statement refers mostly to the amount exported, and sold by our farmers and dealers in the articles above specified.

THE BANKS OF NEWFOUNDLAND.—These banks extend over a space of forty thousand miles, and are from thirty to forty-five fathoms below the surface of the ocean. The shoals are inhabited by innumerable tribes of muscles and clams, to which it is a favorite residence, as they can easily bury their shells in the soft sand. They have enemies to contend with. The cod fish resort to this coast to prey on them. They keep a constant watch, and swim about a foot above the sub-marine sands; when a muscle opens its shell, it is immediately seized and devoured. At other times the fish do not wait; they are provided with a horny protuberance round their mouths; with these they burrow in the sand, and capture the muscle in its shell. The fishermen of various nations, French, English, and Americans, who resort to these banks, take annually from eight to ten millions of fish; on opening them they find the remains of twenty or fifty muscles in each; sometimes the muscle shells are found either wholly or partially dissolved. The first care of the fishermen, after taking their stations, is to ascertain the depth of water; the lines must be regulated so as to lie on the bottom, where the fish are always engaged in this species of sub-marine war.

Observations on the Prevailing Currents of the Ocean and their Causes. [From the United Service Journal.]

There are few branches of science, connected with the phenomena of the surface of the globe, which have hitherto received less consideration than those oceanic currents which every-where prevail more or less in the great body of the waters; and it seems surprising, that in a country situated like our own, and so intimately connected with the element which forms our rampart, as well as the great medium of our wealth and greatness, so little has yet been done to trace this continued circulation to its true and proper source.

Much expectation on this subject was lately excited by the announcement of Major Rennell's work "On the Currents of the Atlantic;" and it was but natural to expect, from the pen of so able and experienced a writer, some elucidation of this hitherto obscure subject. The expectations entertained as to this posthumous work have in many practical points been fully answered; the *existence* and *effects* of many important currents have been explained in a manner that cannot fail to be highly useful to every practical man. But in tracing the *cause* of this mysterious movement, Major Rennell seems merely to have followed the usual track that had before been taken by all former writers on the subject, and has thus been led to attribute *to the winds*, effects which owe their real origin to the main cause of these very winds themselves.

It has long been known, that the prevailing currents, both in the air and in the waters, have a regular set within the tropics, from east to west; and as atmospheric currents in these latitudes, under the name of the *Trade Winds*, have been justly attributed to the rotatory motion of the earth on its axis, it has been incautiously adopted as a principle, that the currents of the ocean arise from the action of the prevailing currents of wind, both in the tropics and in other parts of the earth.

"The winds," says Major Rennell, "are, with very few exceptions, to be regarded as the prime movers of the currents of the ocean; and of this agency, the trade winds and monsoons have by far the greatest share, not only in operating on the larger half of the whole extent of the circumambient ocean, but by possessing greater power, by their constancy and elevation, to generate and perpetuate currents; and although the monsoons change half yearly, yet the interval during which they continue to blow in each direction is long enough to produce effects *nearly similar to the constant trade winds*;" that is, although the winds do not always blow from east to west, but are, during one half of the year, *north-easterly*, and for the other half, *south-easterly*, yet the currents in the open ocean, within the tropics, are *constant*, from east to west, *and thus do not follow the direction of the winds from which they originate*. "The winds, then," concludes Major Rennell, "operating incessantly on the *surface* of the ocean, cause, in the first instance, a gentle but general motion *to leeward*, (as is proved by ships being always to leeward of their reckoning in the trade winds;) and the waters so put in motion form by accumulation streams of currents."—[Rennell on the Currents of the Atlantic, p. 6.]

Setting out, then, upon this principle, in his account of the existing currents of the ocean, as far as they are at present known, it cannot excite surprise, especially if this theory of the origin of the currents can be proved to be erroneous, if many facts are stated in the work of Major Rennell which are utterly at variance with the theory itself; and the consequence naturally is, that, however distinct and instructive the information may be with respect to the individual currents, and the best mode of combatting their influence, we rise from the perusal of the work more than ever uncertain as to the true *cause* of those remarkable streams which are known, in numerous instances, to run in the very face of the steady and prevailing winds which are here stated to be the occasion of them.

In these observations upon Major Rennell's work, we must not be understood, however, as detracting in any way from the highly useful tendency of it in a practical point of view, for which it was chiefly intended; but we beg to offer a few remarks as an attempt to elucidate this obscure but interesting subject, which, like other questions relating to an extended system, must first be viewed on a great and general scale, before we can safely venture to account for the minor portions of it, which come within our more immediate and personal observation.

It appears strange, that while the aerial currents of the atmospheric fluids within the tropics have been so long attributed to their proper cause, it should never have occurred that *the same cause* might probably have *the same effect* upon the aqueous fluids which cover so large a portion of the globe, and that the currents of the ocean might thus be mainly attributed, like the trade winds, to the rotatory motion of the earth upon its axis. The more powerful and constant of the currents of the tropics having a general tendency from east to west, might be

supposed likely to suggest this idea. But if suggested, and put to the proof by actual observation *on a limited scale*, it is probable that the theory would be rejected as inconsistent with the facts, for while the trade winds are found to be in a great degree constant, like the cause which produces them, and only varying a few points to the north or south, according to the season, and the position of the earth with regard to the sun, the streams of the ocean are found to set in various directions, and frequently in *opposition* to the supposed cause; we could not, therefore, feel surprised if some other cause was immediately sought for.

In order, however, to set this point in a proper light, we have only to examine with attention the effects produced by a rapid and rocky descent on the small scale of a river or brook. We here find the general tendency of the stream taking, *as a whole*, a decided course, (say from east to west;) but if we confine our view to the minor parts of this stream, and watch the movements of any small floating substance, as it follows the various eddies and countercurrents occasioned by the rocky impediments in the bed of the river, we shall with difficulty bring ourselves to believe that the general tendency of the whole stream is from east to west, as we frequently find the floating bodies taking a direction from *west to east*, and, at some particular points, even from north to south. This is taking a limited view of what ought to be considered on a wider scale, and may serve as an illustration of what actually takes place when we form a theory for the whole currents of the ocean, by merely observing some particular portions of it.

What takes place in a fluid on a small scale will assuredly occur also on a larger, as both are subjected to the same general laws; and because the trade winds are not so subject to opposition, and consequently to eddies and counter-currents, as the equatorial streams of the ocean, we are not, therefore, to conclude that both fluids are not originally set in motion by the very same cause, for it is obvious that, though their general tendency may be (as indeed it really is) *from east to west*, the numerous interruptions opposed to a regular movement in that exact direction may often occasion an extensive re-action in a direction to all appearance opposite to it.

Let us for a moment suppose the earth to be a body *at rest*, or at least without rotation on an axis; and let us further suppose no dry lands to exist above the surface of the waters, with which latter the sphere would thus be entirely covered. Let us also in idea remove its atmospheric envelope, that all friction or pressure may be removed between the two fluids of air and water: what, then, could we expect to find under such an arrangement? We could not look for any circulation in the watery covering, under such circumstances. Every thing would remain in perfect repose; and unless the waters were preserved in purity by some principle not now in existence, they would soon become corrupted and unsuitable to the nourishment of organic life. But let us now suppose a sudden impulse of rotation to be given to the sphere with its fluid covering; and let us consider what would be the effect of the rapid rotatory movement upon the circumambient waters. If a plate or other shallow vessel containing water be impelled in any direction horizontally, the fluid, participating but little in the impulse, *is left behind* on the spot whence the movement began; it cannot keep pace with the motion of the solid. In the same manner the globe would revolve upon its axis, while the superficial waters would remain nearly stationary, and would have all the appearance of moving in opposite directions, *seeming* to transport floating bodies from east to west, while, in point of fact, the earth *was passing them* from west to east. Thus we perceive that, in the supposed case which we have now put, the steady movement of the solid ball would be imperceptible, while floating bodies on the surface of the water would visibly become more distant in an opposite direction. This apparent movement would naturally be greatest in the equatorial regions, being the outer rim of the revolving wheel; while towards the axis the waters would be little, if at all, affected by the rotation.

Let us now, for a moment, suppose our globe to be surrounded with its atmosphere, or envelope of fluids of a different nature. Without rotatory movement in the solid, there could be no semblance of regular movement in this aerial fluid, and we could therefore have no trade winds. Other partial winds there would be, it is true, occasioned by heat acting on the elasticity of the air, and by a constant succession of expansion and contraction arising from various degrees of temperature. But if we suppose, as before, a revolving and rapid motion to be given to the sphere thus surrounded with its airy envelope, a similarity of cause would immediately occasion a similarity of effect. The *trade winds* would be produced in the equatorial regions, while the circulation of the atmosphere in the more temperate and frigid latitudes would be carried on by the changes of temperature in the same manner, or nearly so, as if there had been no rotatory motion at all.

The effect of the trade winds, and, by analogy, of the oceanic currents, may be simply illustrated by the example of a well-mounted horseman in a calm day. While he remains still, not a breath of air blows. He moves slowly, but produces little effect in deranging the quiet of the atmosphere. The more rapid his course, however, the more violent will be *the current of air* which *seems* to blow in his face whichever way he goes; and even in the case of a moderate breeze, he may "outstrip the wind," and make it seem to blow in an opposite direction.

It must be obvious, then, that the effects of the revolving motion of our globe must be the same, both upon *the fluids of the air*, and upon *the fluids of the ocean*, and consequently, that the regular *trade winds*, and the regular *equatorial currents*, proceed each separately from this cause, and would equally exist even in the absence of the other. But it may be urged, that the trade-winds are much more constant to their course than the equatorial currents, and it therefore seems difficult to imagine that they can both proceed from the same cause. The reply to this objection is extremely simple, when we look a little deeper into the nature and circumstances of the two fluids. The atmospheric fluid is above the surface of the solid, and is but slightly deranged by the asperities and interruptions it may have to encounter, in the form of the islands, continents, or mountains of the earth. Some derangement actually does take place, however from these causes, but it bears no comparison to the counter-currents and eddies which are found in the ocean, arising from the numerous and insurmountable obstacles which are thrown in the way of the regular equatorial streams. In the supposed case, which was before put merely for illustration, we considered the globe to be entirely covered with the waters. Such is not, however, the reality now, although this preternatural effect has certainly existed, on one most memorable occasion, the evident traces of which attest the fact on every part of the surface of the globe. Such is not, however, the usual state of things; on the contrary, the ocean occupies about two-thirds of the whole surface, while the remainder is broken into a thousand dispersed fragments, each opposing its solid form, as the sphere revolves, to the regularity of the oceanic movements. If the smooth and polished wheel of the turner be made to revolve in water, the movement, however rapid, produces little or no commotion in the fluid; but let the polished wheel be changed for one having a toothed or unequal edge, and we shall instantly perceive a very opposite effect. The effects of the paddles of the steamboat on smooth and tranquil waters will also bring this subject home to the mind of every one. We cannot then look for the same regularity of movement in the equatorial currents of the ocean that is perceptible in the equatorial currents of the atmosphere.

In considering the origin of the currents of the ocean, it must be kept in mind that they proceed from two distinct causes, and thus exhibit one of the most wonderful and provident effects to be seen in the order of the works of the Creator. Water and air, if left stagnant, soon become corrupt and unwholesome; and it is evidently a wise provision of the Almighty, which has furnished the laws by which a constant circulation and movement are kept up in both. In the case of the atmosphere, the circulation occasioned by the *winds* takes place, partly by means of the revolutions of the earth on its axis, and partly by the expansive nature of air when affected by the heat of the sun. The lower beds of the atmosphere are elevated into the higher regions by heat; and other portions of the fluid, rushing in to fill up the vacuum, occasion streams of wind of various degrees of force. The seasons of the year, and the duration of the effects of summer and winter in various latitudes, also occasion similar currents of air more or less durable, according to circumstances. But in the case of the currents of the ocean, there are but two causes from which constant currents can primarily arise: one from the rotatory motion of the earth, from *west to east*, which causes an *apparent* current from *east to west* in the open seas near the equator; the other cause arises from the inclined position of the earth with regard to the sun, by which a greater *evaporation* takes place from the waters of the sea within the tropics, than in the more temperate and frigid zones; and on the other hand, a proportioned *condensation* of this vapor (in the form of rain, dew, and snow,) takes place in the latter regions, greatly superior in quantity to what falls, during the whole year, in the former. These effects of temperature are so vast, when viewed upon the scale of the whole earth, that the balance of the ocean would be deranged by them, thus *losing* water in one region and *regaining* it in two others. This want of equilibrium is, however, obviated by constant currents in the ocean, from the poles towards the tro-

pics.* In figure 1 of the following plate, (where the outer line denotes a supposed boundary to the atmosphere,) we see the vapors rising from the equatorial regions, and passing towards the poles, where they return to their parent deep, in the form of dew, rain, and snow. Thus restored to the ocean, they flow towards the tropics, and there chime in with the prevailing currents, in their course to the westward. In the central part of the same figure an idea may be formed of the effect of an intervening continent, in opposing its solid form to the fluids through which it is rapidly and constantly passing, with greater velocity than those fluids can possibly follow it. At 1, the equatorial current meets an opposing cape, which divides it into two parts: one flows pretty freely from the north-west, being kept, however, in its place by the north polar currents pressing towards it. It meets another projection at 7, still farther to the north; and after passing it, the stream is *forced* into its more natural position near the equator, and proceeds in its westerly course, after forming a great counter-current or eddy in the sheltered gulf at 6, where navigators would fall in, for days together, with what would appear, if viewed on a small scale, totally opposed to the theory now under explanation. Returning to the Cape at 1, we find the other half of the northern equatorial stream proceeding to the south-west, where it fills the deep gulf, or sea, at 3, and keeps up the waters there at a high level, on a principle which will immediately be explained. It cannot, however, make its escape in a body or current from this gulf, but, being confined by the southern division of the equatorial stream, a variety of eddies on a considerable scale are produced at 2. It is unnecessary to explain the figure further, by proceeding to the southern hemisphere, where similar effects are produced by nearly similar causes at the points 4 and 5; we may therefore proceed to explain upon what principle the level of the sea in the gulf at 3 is kept up at a higher level than the same surface in the bay at 6, an effect which is known to exist in several remarkable instances on the globe, and which, according to the theory, ought to exist in every situation similarly situated.

By fair analogy, we find that, in this, as in other parts of nature, what takes place on a small scale may also be looked for on a larger. Proceeding then upon this principle, and considering minutely the rapid and rocky course of a brook or river, we find that, so long as the water flows over a smooth and equal bed, the depth and surface of the stream are in all places alike, as in figure 2 of the plate. But when, on the other hand, a fixed and solid opposition is encountered, in the form of a projecting rock, derangement in the level instantly takes place, to a degree proportioned to the bulk of the opposing object. An accumulation or rise in the water takes place on the upper side, until the current finds a vent at one or both extremities, and without this vent, the accumulation increases until the water flows over the top, when the difference of level above and below the object is at once apparent (see fig. 3). But supposing the impediment to be small, in proportion to the size of the stream, still, in every case, a change of level must be the consequence; and the recovery of tranquillity is only completed at some distance below the object, where it, at length, falls again into the general inclination. Beneath or behind this opposing rock, then, there is a sheltered nook, upon which the stream can only act in the form of an eddy; and in such nooks buoyant objects are often kept, as it were, imprisoned by the force of the stream on each side, and floating round in one continual circle. These eddies of the smaller rivers are equally well known to fish and fishers, as both are there sure to find their wished-for prey. Now, all these effects are to be expected on the great scale of the ocean current, as well as in the smaller instance of an inland brook. The *streamward* side of these mighty rivers will always be found on a higher level than the *eddy side*; and consequently the inland gulf at 3, (fig. 1,) ought to be considerably higher than the waters in the bay at 6, which remains sheltered from the powerful action of the current. Thus the level of the Red Sea, which is filled and kept up by the action of a powerful stream across the Indian Ocean, was found, by the French engineers, to be so considerably higher than that of the Mediterranean, that much difficulty and expense would have been incurred in the canal which was once projected across the isthmus of Suez, in order to facilitate the communication with India by this route. A second instance of this effect no doubt exists in the gulf of Mexico, compared with the level of the north Pacific on the western coast of Mexico; but the actual difference of level has not yet been ascertained. A remarkable instance, however, of this difference of level, obviously arising also from the above cause, has been kindly communicated to us by Sir H. Douglas, who was then governor of New Brunswick, where it was found that, in a proposed canal intended to have been cut from the top of the Bay of Fundy to Bay Verte, in the Gulf of St. Lawrence, (a distance by land of only fourteen miles,) the difference of level of the two seas was no less than sixty-three feet,* the rise of the tide in Bay Verte being

Fig. 1.

Theory of the General System of the Currents both of aqueous and aerial Fluids.

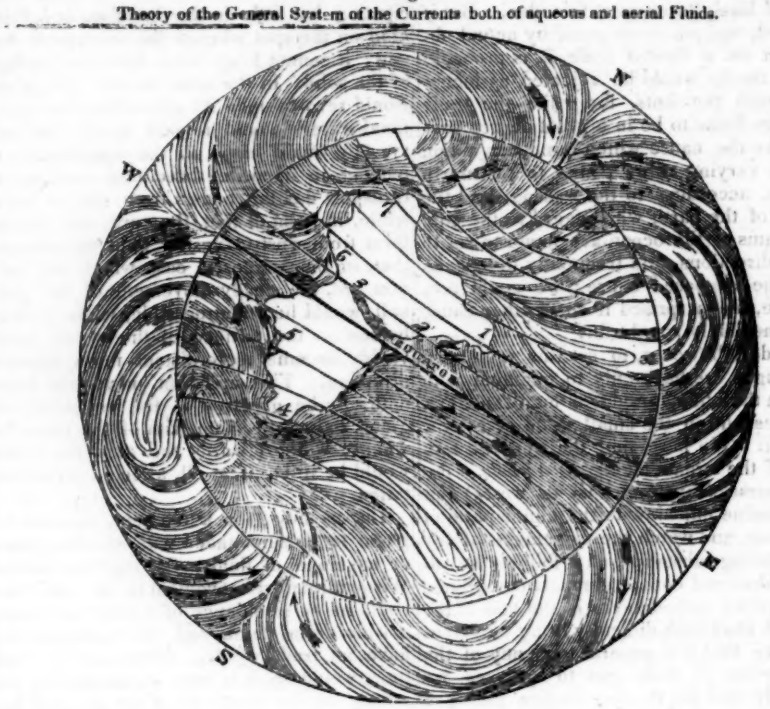


Fig. 2.

Unopposed Current.

Fig. 3.

The Consequence of Opposition.

* It is probable, perhaps even certain, that *heat* has also a very considerable influence in keeping up the movement and circulation of the waters, but it is not likely that currents of great extent are set in motion by this cause. Water, like air, expands by heat, and contracts by a certain degree of cold, not, however, so low as the freezing point, for at that temperature ice is formed, and the formation of ice is always accompanied by violent expansion, so great, indeed, as to burst the strongest vessels, and to cause explosions like cannon, in the lofty glaciers of Alpine regions.

As warm water rises above the colder, (except in the extreme case of ice, which always floats,) and as currents and counter-currents are always acting *horizontally*, and then intermixing the fluids from the poles and from the tropics, it is obvious that an interchange must also be constantly going on *vertically*, in the waters of the ocean, and thus completing the circulation of which the great superficial currents, already described, are the leading cause.

* Surveyed by Mr. Francis Hall, and reported upon by Mr. Telford.

only seven feet, while that in Cumberland Bay, of the Bay of Fundy, exposed to the full force of the Gulf stream, was seventy feet. The Bay of Fundy is kept at this high level in consequence of the projecting peninsula of Nova Scotia impeding the current which rushes along that coast towards the north, and which, from the bend of the coast towards the north-east, is carried in that direction, leaving the gulf of St. Lawrence as a sheltered eddy or nook.

We may now proceed to a cursory view of the whole existing system of the currents, as far as the observations of navigators have made us acquainted with them; but in the rapid sketch which is alone consistent with the limits of a paper of this description, it would be impossible, and even injudicious, to be led from the general outline into any notice of the innumerable minor currents of which seamen have frequently made mention, and which may often be looked upon as eddies and counter-currents, produced by the main body of the stream,* and being occasioned by a variety of changing circumstances, may not again be found in the same exact position.

As it is necessary in this circuitous course to start from some particular point, which may be considered as it were a commencement of the circle, we may adopt as the most proper the western line of the continent of America, whereby the circle is more nearly broken, from pole to pole, than by any other of the dry lands of the earth. Setting out then from this point, and viewing more especially the equatorial line of currents, we enter the immense expanse of the North and South Pacific, where every account that has touched upon the currents tends to establish the fact of their westerly course; and as the force of these currents must there be more steady and equal than on any other part of the globe, from their being unopposed by any thing more important than clusters of small islands, we should not expect them to assume that dangerous and impetuous power by which they are frequently distinguished in the Chinese sea, and in the Atlantic. Mr. Mariner, and other navigators, have given us some interesting proofs of the existence of westerly currents, in the adventures of parties of natives, passing from one island to another, being carried to a distance of many hundred miles, and being found on islands from whence they were utterly hopeless of ever being able to regain their native shores. Of this portion of the globe, however, it must be admitted that we as yet know but little with regard to the currents. But if we find in the Indian Ocean, and in the Atlantic, a series of well established facts in support of the system now under consideration, we have a full right to extend it, by analogy, to the less visited parts of the globe, especially when corroborated by the few but striking facts just alluded to. Proceeding then in a westerly course, and having reached the western bounds of the Pacific, with the Chinese islands and shores on the one hand, and the continent of New-Holland on the other, we hear of a succession of powerful currents from the eastward, forcing their devious courses through the crowded archipelago, and pointing towards the east coasts of Africa. Here the currents of both sides of the equator, being confined in a much smaller space than in the Pacific, and being forced by the form of the land out of that position which is naturally given them by the rotatory motion of the earth, become more violent, and consequently more obvious. In their efforts to retain their position north of the equator, they act with great force against the shores of the seas of Bengal and of Arabia, occasioning in the former the well known and formidable surf of Madras. Finding no vent in a northerly direction, the united stream is forced to the southward, along the east coast of Africa, and if left at liberty, it would follow the southerly impetus thus given to it, and flow into the southern ocean. In this, however, it is opposed by the south polar currents, and it therefore no sooner arrives at the Cape of Good Hope than it doubles that point, in the well-known Lagullas stream, and, running in a north-westerly direction, hastens to regain its natural position on each side of the equator. The force of this current off the Cape is so great, that nothing but a prevalence of westerly winds at some seasons could enable outward-bound ships to make head against it; and even with these favorable winds, ships are constantly found driven to the westward in the very face of the wind.

In following out the course of the equatorial stream across the Atlantic, we find it in part crossing the equator obliquely, and this great moving mass of waters, striking upon the eastern point of Brazil, is divided into two streams, one driven to the southward by the form of the coast of South America, until it is forced round Cape Horn, as it had before doubled the Cape of Good Hope, and joins in with the waters of the Pacific; the other, taking a north-westerly course towards the Caribbean sea and the Gulf of Mexico, passing with considerable force amongst the islands of the West Indies. Having reached the Gulf of Mexico, which opens its extended arms, as it were, to receive it, the current is there brought to a full stop, being precluded from advancing to the westward, or northward, by the form of the lands, and the waters being in consequence *accumulated* into a higher level than perhaps in any other known position of the whole globe. This elevation has often been *supposed*, and has even been shown to be demonstrably certain, without, however, any good reason having even been assigned for the phenomenon. We here, therefore, find a natural, and even necessary cause, upon the same principle as has been already explained by fig. 3 of the plate. The high level of the sea in the Gulf of Mexico cannot, however, pass a certain boundary, and the swell of waters at length finds relief by the only possible, though tortuous course, that is left open for its issue. The stream then rushes with a violence proportioned to its late confinement, round the south point of East Florida, and here, taking the name of the Gulf Stream, it proceeds to the northward, along the coasts of the United States to Newfoundland, where it encounters the Great Bank, and becomes again divided, one portion continuing towards the north and east by Iceland and the coast of Greenland, until again stopped by the north polar currents; and the other, bending to the east and south, is terminated in an immense vortex in the centre of the north Atlantic, where it accumulates on the surface prodigious quantities of the *fucus natans*, or Gulf-weed, which is known to flourish in the warm waters of the Gulf, and to be carried by the stream into the Atlantic, and there covers the surface for hundreds of miles, together with floating timber and other bodies, washed out by the rivers of America. In this great eddy, then, the famous Gulf Stream may be said to terminate; but not so the other portion of the current which had passed on towards the north: when met by the north polar currents from the arctic seas, it is headed back towards the south, along the coast of Norway, and into the North Sea. We here feel its effects upon our own coasts, especially of the north of Scotland, and of Ireland, where floating substances from southern latitudes are frequently found. A minor branch passes through our channel, and rejoins the greater stream across the Bay of Biscay; and the whole at length becomes blended once more in the equatorial current off Cape Verde and the coast of Africa.

In an interesting work which has recently appeared—the Narrative of Capt. Owen's Voyages for the Survey of the Coasts of Africa—we have a distinct proof of the great obscurity which still overshadows the subject of the currents. In the observations on the results which have been gained by this long, interesting, and most fatal expedition, we find the greater part of the subject connected with the currents summed up in the following passages at the end of the work.

"As in the foregoing narrative but few observations have been introduced respecting the currents, and as it is a subject of much speculation and interest, at least to those connected with navigation, the following remarks from Capt. Owen's Journal may be considered worthy of publicity.

"It is a well known fact, as regards the African seas, *that there is a perennial current which sets into the Atlantic Ocean*, round the entire southern extreme of that continent; this current varies in its velocity in different situations, and at different periods, from five miles to one mile an hour. Some writers have supposed that, with reference to the Great Ocean, the Atlantic may be considered as a kind of mediterranean sea, the evaporation from which, together with winter frosts to the northward, must be supplied from the Southern Ocean, in like manner as the Mediterranean is fed from the Atlantic; *and this hypothesis is borne out* by the strong perennial currents about the shores of Cape Horn, and through the islands in its vicinity. But it is remarkable that these currents never appear to extend more than *twenty leagues beyond the common deep-sea soundings*, while their velocity is much decreased when near the shore; from which it may be understood that the depth is much diminished, and the stream broken by projections of bank and sand.

"Ships are frequently carried to the westward, quite round the Cape of Good Hope, *even against the strongest north-west gales*, by this current."

Capt. Owen then proceeds to state the dangerous nature of the short though *high* waves produced by the currents and wind being in opposition, and the most effectual course by which the danger may be avoided. It is quite clear that every thing here

* Major Rennell's work on the currents is accompanied by a laborious and valuable volume of charts, which, if any objection could be made to them, might be considered so minute as to produce confusion. It appears that the courses of the minor eddies have been laid down wherever any naval authority could be produced for their existence, although it is more than probable that a large proportion of them may not again be found in the same position by future navigators

stated is strictly in accordance with the theory here advanced. He bears witness to the *constancy* of the current from east to west; and in other parts of his work, when treating of the east coasts of Africa, and those of Madagascar, he mentions the rapid nature of the currents *passing down from the northward towards the Cape*, by which, in one instance, the Leven, in making the point of Mombas, was driven so far to the southward, that it took her *six days* to regain what she had lost by the failure of the wind for about *three hours*.—[Vol. II. p. 150.]

It is known also that, off the Cape, ships have been driven to the westward, at the rate of sixty or seventy miles per day, *even against* a strong westerly wind.

The only part of Capt. Owen's statement which in any degree stands opposed to what is now advanced, is the allusion to the constant currents at Cape Horn. These are not *stated* to run to the eastward, or *into*, instead of *out of* the Atlantic, but that fact is implied by the theory of *evaporation* from the Atlantic, which is counter-balanced by *entering* currents at both capes. This is opposed by the general reports of the navigation of Cape Horn; it is opposed also, most distinctly, by the much better attested facts of currents *out of* the South Atlantic towards the north. For if evaporation took place on so great a scale as to produce *entering* currents at the two great capes, we must admit that an *entering* current should also flow from the colder latitudes of the north, which is not the case. As to the fact of the current at the Cape being little felt *close in shore*, and gradually diminishing in force as it extends to the open ocean, a hundred miles or more from land, it is in every way consistent with the whole theory of inland rivers. In the case of a projecting bank or rock in a river, the actual point of contact is exposed to great violence, but every other point of the stream exhibits the phenomena described by Capt. Owen off the Cape. Under the most projecting rock or point, comparatively smooth water is generally found close to the side; while the main body of the stream drives past with a distinct and rippling outline, diminishing in force, however, as it spreads out into the expanding pool below.*

We have thus passed in review the great and leading course of this wonderful and most admirable system by which the waters of the ocean are kept in that continued movement so necessary to their purity, and by which, also, it is highly probable that many important ends are effected, in regard to the amelioration of the climates of various parts of the earth. The land and sea breezes of the hotter climates are now well known, and also their causes. We may naturally suppose this wholesome interchange to be powerfully affected by streams of current from the cooler latitudes; and we also may be assured that the heated waters of the Gulf Stream must carry along with them into the Frozen Ocean a degree of warmth which cannot but materially affect the rigidity of those latitudes. Even in our own country, we are well aware, from continued experience, of the mild effects of a westerly wind. We have no particular warmth to look for from the *lands* to the westward of us; on the contrary, the winters of Labrador and of Canada are well known to be unusually severe. But when we find that a vast reservoir of heated water, and consequently of *warm vapors*, exists in the Atlantic, we can no longer find a difficulty in naturally accounting for the mild and humid effects of our westerly winds, which, even in winter, produce on Ireland and the west coast of Britain the verdant growth of a milder season.

It is scarcely necessary, in conclusion, again to revert to the theory of the winds being the prime movers of the currents; for besides the arguments already adduced, by which we trust it has been shown that ocean currents could not but exist, even if there were no winds whatever, we have only to examine the numerous instances mentioned even by Major Rennell, of ships being drifted far to *windward*, in the very teeth, not of transient breezes alone, but of settled and heavy gales. "One ship," says he, "was carried 10° of longitude (*equal to* 570 *miles*) to the westward, between Cape Verde and the Cape of Good Hope, and yet had been subjected to the south-east trade wind. Another was driven 220 miles, between the Canaries and the coast of Brazil. Another in the equatorial current, in June and July, was set 297 miles to the westward, *in five following days*, between 3° north and 4½° south, and yet had entered the south-east trade wind." Such, and numerous other instances, well known to all seamen, are sufficient to show that the currents must be set in motion by some much more powerful and less *superficial* cause than the mere *friction* of the winds, however fixed or severe. That the winds agitate the *surface* of the waters no one will attempt to question; but that this agitation can extend to the vast depths at which the law of fluids above explained must operate, we have not the slightest reason to suppose. Major Rennell brings forward, in proof of his theory, the well known fact, that the surface of a canal, or of a lake, is always higher at the *leeward* than at the *windward* side. This fact is at once admitted, but it is one of very small effect, and merely *superficial*, being occasioned by *waves*, and instantly subsiding with these waves. But in order to prove the point, it must be shown, that in a straight canal of several miles in length, with a strong breeze right on end, the force of the winds, near the middle of the distance, (where they must have acquired their full force,) can affect an object of no great weight *at the bottom of the canal, and at a depth of four or five feet.* If this effect takes place in canals, or in large inland lakes, such as those of North America, and also at considerable depths, the theory might be supposed to derive some support from it. But this is not the case; and in inland lakes, of whatever extent, although the surface may be raised on the leeward side, in violent winds, objects deposited at a few feet of depth lie perfectly secure and unmoved.

The winds would not, therefore, effect the end for which the great circulation of the waters of the ocean is obviously intended; and any theory of the currents, which is mainly founded on so false a ground, however ably it may be treated, cannot but mislead the mind, and in many instances prove injurious, not only in a scientific, but also in a practical point of view.

WATER FOR GREEN-HOUSE PLANTS.—Soft pond water, such as is supplied from the watering or floating of meadows, holds in solution, and in its most limpid state, all the food which most plants require; and it is only such food as they are capable of taking up by their spongioles, or digesting by their system. Such water is not attainable by every person; but I think that a good substitute might be artificially procured by placing some turfs from a common or sheep-walk, into a large wicker-basket; and, after nearly filling the basket with them, to place *two turfs manured with a thin layer between them of poultry or sheep dung*, at the top of the basket. The best and softest water that can be had should then be poured over the turfs till it filtrates, in a clear state, into a recipient vessel placed underneath. A bushel-basket would last, for this purpose, many weeks, and suffice for the saturation of some hundreds of gallons of water with nutritious matter, and also for the detention of other particles which could not be assimilated by the organs of the plants.—[Mr. Mearns, gardener to the Duke of Portland.]

ENCLOSURES.—Most of the modern nations of Europe still enclose their lands in the ancient method. Property is so much subdivided in France by the extinction of the law of primogeniture, that no *field* enclosures are to be observed in that country,—a few marchstones, a row of trees, or particular single trees here and there, marking the boundaries of estates. Throughout Germany, Bohemia, Switzerland, Spain, and Italy, enclosures are only found near farm-houses and villages, the bulk of the corn being raised on extensive unenclosed grounds. On the other hand, the land in Holland and Belgium is in general very much enclosed, so much so, that the fields appeared half choked with hedge-row trees and hedges. The same remark very nearly applies to the south of England, where much valuable ground is occupied with, certainly beautifully luxuriant, but sadly neglected hedges. The land in Ireland is also too much subdivided, and mostly with turf walls, which are generally very unfit to detain live stock. It is in the north of England, and the best cultivated districts in Scotland, that enclosures, suited to the improved state of the husbandry of the kingdom, are to be found. There, not only whole farms are enclosed, but the size of the enclosures conforms to that system of husbandry which is suited to the nature of the soil. There, the growing crops of all kinds receive shelter from the vicissitudes of the weather, and protection from the depredations of live stock; and the live stock themselves enjoy, as a recompense for their confinement within the enclosures, peace and plenty unmolested.

A fence occupying elevated ground bestows more shelter to fields than in other situations; and on this account, if any other circumstances will permit it, the elevated

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* Major Rennell gives many interesting instances of bottles and other bodies carried by the currents. In one case a bottle was thrown overboard from the Osprey, of Glasgow, on the 17th of January, 1822, in 6° 13′ south latitude, and 15° 35′ west longitude, and it was found on the 27th of July of the same year, in Mayard Bay, in the island of Trinidad.

In another case, still more remarkable, a bottle was thrown from the American ship Lady Montague, on the 15th of October, 1820, two leagues north-east of the island of Ascension, and was picked up *on the west coast of Guernsey*, the 6th of August, 1821, and notice of it sent to the Admiralty. It is certain that this bottle must have passed, in ten months, over the whole course of the Gulf Stream, and from thence be carried (probably by the coasts of Iceland) into the North sea, and through the English Channel. We cannot, however, decide from this, or almost any instance of floating bodies, as to the *rapidity* of the current, for we cannot tell how long it may have been detained at various points, nor how long it may have remained on the spot where it was eventually discovered.

summits of rising ground ought always to be chosen as the sites of fences. Such sites place a thorn-hedge beyond the crushing power of a heavy fall of snow. But it generally happens that the lower ends of fields cannot be enclosed in a straight line,—a rivulet or hollow between two rising grounds frequently terminating their lower ends. In that case, the fence ought to follow the course of the water or hollow ground, in order to provide an egress for the surface-water coming from both sides of the rising ground. A serpentine fence in a hollow, contrary to one on a rising ground, affords more shelter than a straight one, in the direction of the wind, which almost always takes the direction of the valley. A public road or canal passing through a property, or an old plantation growing in the middle of the land, affects the shaping out of enclosures. Whether any of them exists before or after the land is enclosed, the irregular sides of the enclosures, which alone should contain wedge-shaped ridges, should be placed next the obstacle.

The advantages of enclosing land may thus be summed up. Enclosures shelter corn against the inclemency of the weather, and they prevent the trespasses of men and animals. They not only afford the most excellent shelter to live stock, but they insure them peace and protection while feeding, or when at rest. They enhance the value of land in every situation; and they greatly beautify the appearance of a country. They confer ease of mind to the farmer by securing his crops, and flocks, and herds, from danger; and they impart confidence to the country gentleman, that the enclosing of his estate of land and wood will continually improve his means, so long as he continues to protect it by maintaining the fences in an efficacious manner.

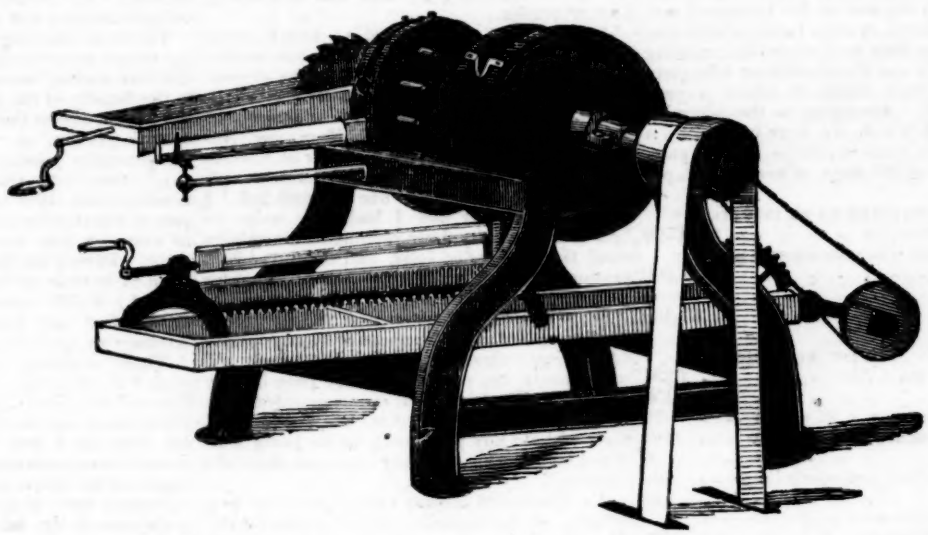
Rollers—Sowing Grass Seeds.—[From the Northern Farmer.]—Farmers who are in the practice of using rollers to level and smooth the ground, are fully convinced of their great utility. How inconvenient it is to mow when the surface is very uneven, or where small rocks lie upon it. And there is a loss of labor in being obliged frequently to grind the scythe, or in case of breaking, to get a new one. In laying down the soil to grass in the spring, the roller makes "smooth work," and drives down the pebble stones and small rocks beneath the surface, and also renders the appearance of the fields more delightful. But the use of the roller is very beneficial in sowing grass seed. The harrow, unless made with very fine and very short teeth, ought not to be used; because the grass seed, which the common harrow buries, one, two, or three inches beneath the surface, does not vegetate. In sowing grass seed I now use only the roller, and it "catches in" much better than it does by harrowing it in. After a light gravelly soil has been well ploughed and harrowed, it may often do very well to sow the grass seed upon the surface, before a rain. This fact, perhaps well known to many, I learned by accident. I directed my hands to lay down a field with rye and grass seed. But they forgot to sow the grass seed, as I learned after the rye had sprouted. Believing that the use of the harrow would then destroy the rye, I scattered the grass seed upon the surface, and never had any catch in better. But there were several rains soon after. This experiment has induced me to use only the roller.

Should it be desirable to pick rocks while operating with the machine, it would be easy to construct a box, to be attached to the frame. The strength of the roller may be increased by nailing iron hoops round the outside. I think that large are preferable to small wheels. In order to turn the machine with the cattle with greater ease, it may be judicious to have the circumference in the middle a little larger than at the ends. But when the middle rests upon rising ground, or a little hillock, in the act of turning, there is no great difficulty.

Many farmers suffer their cattle, in the wet seasons of spring and fall, to graze in their mowing fields. By this practice the soil is not only beaten down and rendered uneven, counteracting the good effects of the roller, but the grass roots are much injured, and, by the fall feeding, are, indeed, more liable to be winter-killed. It is a practice which ought to be discontinued. The inevitable consequence of it is either to reduce or else prevent the increase of the quantity of hay. W. Claggett.

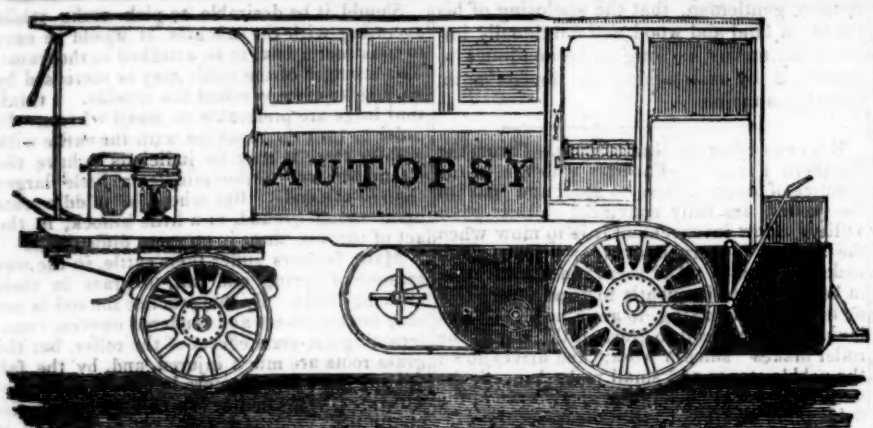
Portsmouth, March 24, 1834.

Female Supremacy.—By all external symptoms, says an amusing writer in this month's Metropolitan, we may apprehend that the reign of women is fast approaching: look at the present aspect of Europe; a Queen of Spain, a Queen of Portugal, a prospective Queen of England. So that we are, at last, to be duly brought under "petticoat government." There is, too, Mrs. Norton conducting a magazine, and Mrs. Cornwall Wilson a weekly publication. Have not women invaded literature and art in all its branches—nay, the most awful arcana of science? There is Mrs. Somerville teaching us the mechanism of the heavens; while Miss Harriet Martineau gives us lessons on political economy.—[London paper.]



Wiswall's Yoke Cutter for dressing Spokes of Wheels.—By means of a circular saw operating in connection with the cutter wheels, the timber is squared and cut to any length that may be required, and the tenons of the spokes are then formed of any required dimensions. The spoke being presented to the action of the first cutter, or tenon wheel, by hand, the tenon is formed in less than a minute, and the body of the spoke is dressed into shape and smoothly finished, first on one side and then on the other, by two operations, in another minute, more perfectly than it could be by any mere hand tool, though used by the nicest operator. No means of forming the round tenon which is to be inserted in the rim was exhibited. This, it is obvious, must be effected by a fourth operation. The whole machine is evidently capable of a more perfect construction than that examined by the committee; but such as was exhibited in operation is evidently a useful improvement, and a labor saving machine of great profit. It saves all the time which an operator by hand necessarily expends in judging by his eye of the exactness of the shape given, and to be gained by his tool, and may be operated in artificial light, when the laborer by hand would be scarcely able to judge of his own work. There is therefore much gained by the art of making wheels, which artists in that branch of mechanics will find profitable to themselves, as they can employ their journeymen more usefully on other parts of the wheel, and in adjusting them to each other.

Salt.—The people of Onondaga County, N. Y., believe that they have under them an inexhaustible mass of rock salt, and that in raising this, instead of brine, they shall save half the expense of manufacturing, and be able to supply the Atlantic towns with salt cheaper than they can import it. There is one difficulty which now threatens, and that is the expense of fuel. The wood now used at the different salt springs now in operation amounts to 400 cords a day, and as the works are in use 200 days in a year, the annual consumption is 80,000 cords.



HANCOCK'S STEAM-CARRIAGE "AUTOPSY."—We give an engraving of Mr. Hancock's last new steam-carriage, the "Autopsy,"—the same which performed the journey to Brighton and back, with so much success, about three weeks ago, and which has been running daily, during all the present week, between Finsbury square and Pentonville. We have witnessed its performances repeatedly, both as passengers and as lookers-on—and only re-echo the general opinion, when we say that it works admirably. The machinery, which is constructed on the improved plan, for which Mr. Hancock's last patent was taken out, will be found fully described in a subsequent communication from Mr. Hancock himself.

The quantity of coke expended in each journey of (about) two miles, scarcely exceeds a bushel; so that even supposing the tear and wear were to be as great as in the case of Mr. G. Stephenson's engines on the Liverpool and Manchester Railway, or even twice or thrice as great, the returns from such a carriage, running between the City and Pentonville or Islington, must be sufficiently ample to afford a very handsome profit. According to the following calculation, with which we were favored by a fellow-passenger, there would be a clear gain, during a period of 365 days, of nearly cent. per cent.

CAPITAL REQUIRED TO BE INVESTED.

Cost of steam-carriage - - - - - -	£700
Spare ditto, to use when the other is under repair, - - - - - - - - - - - -	700
	£1,400

Dr.

Wages—engineer 40s. per week, steersman 30s. assistant 20s. - - - - - -	£234
Repairs - - - - - - - - - - - -	150
Tolls 4d. each journey × 12 × 365 - -	73
Coke 6d. per journey × 12 × 365 - -	109
Water - - - - - - - - - - - -	50
Rent of coach office and coach house -	100
Clerk - - - - - - - - - - - -	50
Premium to the patentee, at the rate (say of 1d. per passenger) 12 × 24 × 365	438
Reserve Fund to replace carriage when worn out—probably in 3 or 4 years -	175
	1,452
Dividend of £84 on £1,400 - - - - -	1,176
	£2,628

Cr.

By twelve journeys per day, and twelve passengers each way, at 6d. each, 12 × 24 × 365, - - - - - - - - - -	£2,628

[London Mechanics' Magazine.]

Mr. Rutter's New Mode of Generating Heat—Successful Application to Gas Works. [From the London Mechanics' Magazine.]

SIR,—I beg you will not impute my long-continued silence to any other cause than incessant occupation during the last three months. I am not indifferent to the opinions of some of your correspondents, nor am I insensible to the kind wishes which have of late been expressed towards me, in reference to my process for generating heat.

To dislodge prejudice is no easy task, especially when it has become venerable by age, or respected through the influence of great names. Truth will eventually prevail; but its progress bears no analogy to that of the glowing meteor. May it not rather be compared to the twilight of the morning, that melts imperceptibly into the dawn of perfect day!

It was once the fashion, I believe, to devise ingenious theories, and then endeavor to make practice conform to those theories. This seems to have been beginning at the wrong end. A more natural process is now adopted,—a process in which experiment supplies the materials for constructing theories and illustrating first principles.

Arrears have accumulated so heavily upon me that I scarcely know where to commence. If I pass over any of the observations of your correspondents which appear justly entitled to notice, I hope you will believe the omissions are unintentional. Until Colonel Macerone (No. 529, page 453,) republished his letter of November 25, 1826, I was wholly unacquainted with his views respecting the use of liquid fuel. I do not remember that I had ever seen, or heard, or read, any thing relating to the subject until the summer of 1832, and then my information extended no further than that coal tar was employed in heating gas retorts.

Mr. Cheverton (No. 531, page 28,) first made me acquainted with the name of Morey, whose 'American water burner' was very kindly and opportunely described (No. 533, page 52,) by Mr. W. H. Weekes. That experiment was new to me. I have since tried it, but, I must confess, without any perception of its being rendered "applicable, in many cases, in place of a furnace."

Mr. Cheverton implies a doubt as to the possibility of decomposing water economically. He admits, however, that "our knowledge of light, heat, and combustion, is very obscure, and that experiment is our best guide in the absence of perfect theory." I fully agree with him.

Almost all that was formerly known about the conditions of decomposing water by heat, seems to have related to effecting it in close tubes or vessels, heated externally, the hydrogen being liberated through the agency of readily oxidizable surfaces. The conditions of my process are very different from those just mentioned.

That water is decomposed when employed in conjunction with certain carbonaceous fluids, may be doubted or denied. It is one thing to deny, another to disprove: seeing, with some persons, is not always co-existent with belief. But truth is unalterable, whatever differences of opinion may prevail respecting it. In physical science, fact and experiment constitute the only safe guides to theory. Theories may be constantly changing, or they may be altogether false: not so the laws which govern the elements of the material universe. We may be ignorant of those laws, but are they on that account the less uniform and invariable in their results?

Mr. George Bayley (No. 533, page 52,) has my thanks: were he to see my memoranda of last May and June,' he would be amused at the coincidence of our views respecting the use of tanks for stowing tar and preserving the trim of vessels. Will Mr. Bayley permit me to set him right in a trifling matter? The specific gravity of coal tar is *greater* than that of water.

The communication of your Salisbury "correspondent" was almost a verbatim copy of my own printed statement. I have no intention of interposing between "Correspondent" and "An Old Gas-maker," neither of whom are known to me, excepting in your pages; yet I may perhaps be permitted to say a few words to the latter, in reply to his remarks, No. 537, p. 125.

It never was intended to set forth that 17,100 cubic feet of gas could be obtained from a chaldron of Newcastle coal *only* through the agency of my heating process. It would be mere trifling to say that heat, externally applied to retorts, whatever may be the kind of fuel employed, could materially affect the internal process of distillation. All other conditions being the same, I produce an equal quantity of gas from a given quantity of coal, whether the fuel employed be coal, or coke, coal and coke combined, or coal in conjunction with fluid materials. I will not say that an equal amount of work may be done in the same time, and at the same cost with solid fuel, as with solid and liquid together. In the former case it is more difficult to preserve the same uniformity of temperature than in the latter; and it is impossible, by any ordinary means, to obtain an equal quantity (or intensity) of heat from equal weights of solid and of liquid fuel.

The most startling part of 'Correspondent's' (or rather my statement), in the view of 'An Old Gas-maker,' seems to be that which relates to the density of the gas. An increased quantity of gas, and at the same time "an increased specific gravity," is "so much at variance with the generally received opinions of the present day," that "An Old Gas-maker cannot but conclude that there must be some error in that part of the statement." I have great pleasure in assuring him that there is not the slighest error. During the week last past, I have made from 81 bushels of Newcastle coal (80 lbs. per bushel,) 40,590 cubic feet of purified gas = 18,036 feet per chaldron = 14,028 per ton. Average sp. gr. 0.535.

These workings may not be in accordance with "the received opinions of the old school." I cannot be answerable for that. Experiment, not opinion, has been my guide. I only exhibit facts as I find them. By experiment I would have it understood that I mean not a *mere* experiment, which may rather be viewed as an exception than adopted as a rule. The manipulations of the laboratory are very often at variance with those of the manufactory. All my experiments have been conducted in the ordinary course of practical workings, and the results have been verified in the course of successive days, and weeks, and months.

At a neighboring station my mode of working has been successfully adopted. Last March the maximum product per chaldron on that station was 13,000 feet. In October, from the same kind of coal, 16,500 feet were made.

It has been said that it is impossible to make 18,000 feet of gas from a chaldron of Newcastle coal, since it involves the absurdity of getting more out of the retorts than had been put into them. This is assertion without proof, and is as much deserving of credit as the received opinions, that quantity and increase of sp. gr. are always in a direct inverse ratio.

To comfort an Old Gas-maker, I can assure him that the retorts I am now heating, by

means which he is pleased to designate 'a new combination of the fiery elements,' are in excellent condition—and the furnaces stand well. The same retorts did almost all the work of the station here, during the last winter.

I am not sure that I have yet attained to the maximum product of gas from a given quantity of coal. After making 18,000 feet per chaldron, I find there are sufficient materials to make probably 4 or 5,000 feet more gas. At present I have no means of appropriating these materials for gas-making economically. With the same retorts, and the same apparatus that I am now working, I required, in Nov. 1832, to produce 46,580 feet of gas, 136 bushels of coal. In Nov. 1833, I have made an equal quantity of gas from 92½ bushels of the same kind of coal.

A question in which every practical gas-maker should feel interested, is, whether it be best to keep up a large fire principally for the purpose of making tar and coke, and ammoniacal liquor, or whether that fire may not be more profitably employed in generating gas?

It would extend this paper beyond all reasonable limits, were I now to enter more fully upon details. It would, moreover, be anticipating the proposed publication, in a different form, of my views and experiments connected with this subject. 'An Old Gas-maker' will, I hope, exercise a little patience; and if I appear to him somewhat slow in my movements, let him remember that I am neither an *old* gas-maker, nor a gas-maker by *profession*. All I do in that, or any other department of science, is during the few interstices of leisure that occur amongst more important engagements.

Will Mr. E. Walker, No. 536, p. 107, be so good as to inform the readers of the Mechanics' Magazine, by what means he has ascertained that coal gas, when used in close apartments, is a *deadly poison?* Is it absolutely necessary, when this gas is so used, that it should be permitted to escape into the room? What are the properties of the respective products of combustion resulting from purified coal gas and *long ten* tallow candles?

That I am deeply interested in these questions, Mr. Walker will perceive, when I tell him that I use gas in my bedroom instead of rush candles. I have done it because gas is cheaper than candles, and much more convenient.

J. O. N. RUTTER.

Lymington, Nov. 27, 1833.

Mr. Rutter's New Mode of Generating Heat. [From the London Mechanics' Magazine.]

SIR,—Mr. Rutter says, with truth, that his invention is never likely to be used where fuel is cheap, for according to his statement, although tar is but three-pence per gallon, it is still dearer than coal, the account standing thus:

4 cwt. 0 qr. 20 lbs. of coke at 25s. per ton,	5s. 2½d.
27½ gallons of tar at 3d.	6s. 10 d.
	12s. 0 ½d.

And coal may be had at from 7s. to 12s. per ton.

Besides, as the demand for tar increases, so must it increase in value, and thereby operate still further against its general adoption. Then, as regards originality, without wishing to detract one iota from the merit of Mr. Rutter, I think it but right to say that, at the gas-works here, tar has been consumed for some years past, not for the sake of economy, but merely to get rid of it, and, as I take it, in a manner somewhat analogous to that proposed by Mr. Rutter, viz.: over a certain measure of coke are thrown two cans of water, and one of tar; but from the effluvia arising from its combustion, this admixture cannot be used.

In commenting on the new mode of generating heat, Mr. G. Bayley, page 51, has been hurried, by an inconsiderate admiration, to wander far from the truth, and that, principally, through confounding weight for bulk. Want of "stowage" can only be understood to imply want of room, and a chaldron of coal and a chaldron of coke must occupy equal spaces; but as the former weighs 28, and the latter only 18 cwt., "stowage" cannot possibly be found in the same vessel for an equal weight of each. The comparison of volume and weight will therefore stand thus—

	cwt.	qr.	lbs.
A chaldron of coke	18	0	0
110 gallons of tar	10	3	6
	28	3	6

Which, multiplied by 3, will be equal to 86 cwt. 1 qr. 18 lbs. of coal.

Taking the specific gravity of coke and tar as equal, it gives 1·599 chaldron of the compound, and 3·084 chaldron of coals, or the effective quantities rather less than two to one, instead of three to one, as stated by Mr. Bayley.

As regards stowage, water of course need not be taken into account; but in estimating the comparative cost, 15 or 16 cwt. of water being required for every ton of coke, some allowance ought to be made on account of the labor, &c. necessary to remove it from alongside into the reservoir for supplying the fire. I will take leave of the subject at present, with noticing two minor errors: first, Mr. Bayley states the fluid required is withal of less specific gravity than water; while Mr. Rutter states the tar to be 11 lbs., and water is but 10 lbs. per gallon. Again, in stating the comparative economy, he says, 1½ gallons of tar at 1½d. per gallon, is a 1½d but this is no doubt a press error. Yours, respectfully,

TREBOR VALENTINE.

Application of Mr. Rutter's New Mode of Generating Heat to Steam Vessels. [From the London Mechanics' Magazine.]

SIR,—My remarks, in No. 533, page 32, appear to have excited the displeasure of your talented correspondent, Trebor Valentine, on account of my "inconsiderate admiration" of Mr. Rutter's new method of generating heat, which, he says, had led me to wander far from the truth. This is a grave charge, and were it not made by a person in a mask, I might be induced to take it in high dudgeon.

How far I am justly liable to the charge of "inconsiderate admiration" of the process, is known only to myself. Not having a copy of my former letter at hand, I am unable to refer to the precise terms I then employed; but I have a distinct recollection that my "inconsiderate admiration" was chiefly referable to three points, viz., the saving of stowage, weight, and expense. It so happens that I have had some experience in building and navigating steam-vessels, and may, therefore, without presumption, lay claim to so much practical knowledge as to be qualified to express an opinion upon the desirableness of Mr. Rutter's method of generating heat.

I have often felt the want of convenient stowage for coals, notwithstanding there were many vacant spaces low down in the vessel, each containing a few cubic feet, in which small tanks for coal-tar might have been advantageously placed, but which were either unsuitable or inconvenient for the stowage of coal. The trifling weight of coke, compared with an equal bulk of coal, renders it much more convenient for stowage on board a steamer than coal, as it can be safely and advantageously stowed where it would be highly imprudent to stow coal, on account of its greater weight. Mr. Rutter's plan allows of the division of the fuel into small masses, so that, by due arrangement, it may be stowed in such a way as to lower the centre of gravity, and thus increase the stability of the vessel. Whether I have bestowed "inconsiderate admiration" on Mr. Rutter's plan, in this respect, I leave to you and your readers to decide.

With regard to the diminution of weight, I took Mr. Rutter's data, and, on reference to my former communication, think that it will be found that the difference is 3 to 1 in favor of Mr. Rutter's plan. Even on Trebor Valentine's own shewing, it is 2 to 1, which is sufficient advantage in point of weight to secure the "inconsiderate admiration" of persons like myself, who have found ourselves greatly impeded in our progress by the great weight of the coals we were compelled to take on board to supply the engines. But our "inconsiderate admiration" goes yet farther on this head, because the fluid admits of being stowed away in tanks, fitted to the vacant spaces near the bottom of the vessel, so as to bring the centre of gravity lower down than it usually is in steam-vessels worked with coals in the ordinary manner. This alteration in the centre of gravity would greatly increase the stability of a steamer, and lessen the labor of the captain and crew in trimming her upright when heeled either way, by the shifting of the passengers, or by the pressure of the sails. It is also very desirable to keep the vessel in as nearly the same trim as possible, that the paddle-wheels may act with their maximum effect. Mr. Rutter's plan offers the advantage of being able to dispense with half the weight we are now obliged to carry, and thus offers another attraction to call forth the "inconsiderate admiration" of the captains and engineers of steamboats.

It appears that I have made a blunder as to the specific gravity of the tar, and I stand corrected. I had no intention to misrepresent the fact, but having, as I thought, observed that coal tar floated on salt water, I considered its specific gravity to be rather less.

I took the cost of the tar at 1½d. per gallon. I formerly purchased it at one penny per gallon, and not knowing its present price in large quantities, I thought that I had made sufficient allowance by stating it at three halfpence; and your correspondent, in No. 543, page 211, fully bears me out in my estimate being rather above than below the mark. Why Trebor Valentine should charge me with having wandered far from the truth, I cannot conceive, seeing that, for the purpose of convicting me of an error, he has at least doubled the cost of the ingredients in Mr. Rutter's plan for generating heat. Surely his "inconsiderate" prejudice, or something else, has led him far from the truth here, in order to decry a plan which, to say the least, is worthy of our approbation, for having suggested a method of applying to practical purposes a mode of generating heat which has hitherto been confined to the laboratory of the experimental chemist.

My calculation of the expense was made, as may be seen, upon the data furnished by Mr. Rutter, as to the quantities of fuel required to produce a certain effect. If he has erred in the proportions, my results are erroneous; but from the knowledge which I possessed of the cost of the articles, my impression was, and still is, that he had rather overrated the cost than otherwise.

If the cost of generating heat, upon Mr. Rutter's plan, should prove to be as great as by the present method, yet its saving of stowage and weight is sufficient to call forth the "inconsiderate admiration" of every one who has the charge of navigating a sea-going steamboat.

Trebor Valentine appears to have fallen into a very common error, viz. that if a certain weight must be carried on board a steam-vessel, it is of no consequence where it is put, whether on the deck or low down in the vessel's hold. Every nautical man knows that, with the same weight, a vessel may be either put into a good trim or be rendered utterly unseaworthy, according to the manner in which the weight is distributed, with regard to the centres of gravity and floatation.

It is a source of gratification to find that my views of the utility of the tanks for stowing tar coincide with those of Mr. Rutter; and I shall be glad to find that his plan is in actual operation on board some sea-going steamers; and I hope that you will not fail to give your readers the earliest information, with ample details of the results. To none will the information be more interesting than myself, for, although now unconnected with maritime affairs, I do not cease to feel a lively interest in every thing that relates to navigation and naval architecture. I am, yours, &c.

GEORGE BAYLEY.

STEAM ENGINES.—The French Academy of Sciences have awarded a gold medal to M. Ga-

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ly Cazalah, a professor in the Royal College at Versailles, for a discovery which, it is said, will give perfect security against the bursting of steam engine boilers.

RESISTANCE OF FLUIDS TO BODIES PASSING THROUGH THEM.—The following notice has recently appeared of a paper entitled "An Account of a Second Series of Experiments on the Resistance of Fluids to Bodies passing through them," by James Walker, Esq. F. R. S. Civil Engineer; which was read before the Royal Society on June 6th, 1833.

The author, in a paper read to the Society in the year 1827, and printed in the Philosophical Transactions, gave an account of some experiments showing that the resistance of fluids increases in a ratio considerably higher than the square of the velocity, and that the absolute resistance is smaller than had been deduced from the experiments of the French Academy. In the present communication he states the results of his further inquiries on this subject. His experiments were made at the East India Docks, on a boat twenty-three feet long and six wide, with a stem and stern nearly vertical; one end being terminated by an angle of forty-two degrees, and the other of seventy-two degrees; and the resistance to the boat's motion being measured by a dynamometer. The results are given in tables; and it appears from them that in light vessels sharpness is more important in the bow than in the stern; but that the reverse is the case in vessels carrying heavy cargoes. From another series of experiments the author infers that the resistance to a flat surface does not exceed 1·25 lb. for each square foot, at a speed of one mile per hour; increasing for greater velocities, in a ratio considerably higher than the square of the velocity. The author concludes with some observations on the results lately obtained in Scotland, where great velocities were given to boats moving on canals, without a proportional increase of resistance.—[Proceedings of Royal Society.]

CAPACITY OF BODIES FOR WATER.—As it may be interesting to many to know the comparative as well as the positive absorption of water by various bodies, we subjoin the following table, the details of which were made with care. The weight of each substance was ascertained before immersion; next, when the water ceased running and began to drop; and, lastly, when all dropping had ceased, and the bodies were in that state in which they may be supposed to be full of moisture.

	Dry.	*Dripping.*	*Done dripping.*
Flannel.....	144 grs.	1553 grs.	700 grs.
Woollen Cloth..	56 "	370 "	191 "
Linen	375 "	2110 "	1050 "
Calico.....	115 "	1150 "	450 "
Cambric Muslin.	95 "	883 "	307 "
Very fine do.	54 "	715 "	297 "
Glove Leather..	106 "	1170 "	677 "
Kid do. ..	172 "	770 "	421 "
Shoe do. ..	95 "	194 "	177 "
Sponge.....	185 "	2440 "	2070 "

From these data the following table may be constructed, to show in the first instance the absorbing powers, and, in the second place, the retaining powers, for moisture, of the various bodies thus experimented upon:

Flannel absorbed 11 and retained 5 times its weight of water				
Woollen Cloth	6½	"	3½	"
Linen Cloth	5½	"	3	"
Calico	10	"	4	"
Cambric Muslin	9	"	3½	"
Fine Muslin	13	"	5	"
Glove Leather	11	"	6½	"
Kid do.	4½	"	2½	"
Shoe do.	2	"	2	less a fraction
Sponge	13	"	11	"

From these results, it may be seen that, although some substances, in the first instance, take up an equal or nearly an equal quantity of water with the sponge, such as the flannel, fine muslin, and glove leather, yet their powers of retaining the same are very far inferior.

BLINDNESS OF PASSION, OR MISTAKES OF A KAMTSCHATKAN BEAR.—Fish, which forms their chief nourishment, and which the bears procure for themselves in the rivers, was last year excessively scarce in Kamtschatka. A great famine consequently existed among them, and, instead of retiring to their dens, they wandered about the whole winter through, even in the streets of the town of St. Peter and St. Paul. One of them finding the outer gate of a house open, entered, and the gate accidentally closed after him. The woman of the house had just placed a large tea-machine, full of boiling water, in the court: the bear smelt to it and burned his nose; provoked at the pain, he vented all his fury upon the kettle, folded his fore-paws round it, pressed it with his whole strength against his breast to crush it, and burned himself, of course, still more and more. The horrible growl which rage and pain forced from him brought all the inhabitants of the house and neighborhood to the spot, and poor bruin was soon dispatched by shots from the window. He has, however, immortalized his memory, and become a proverb amongst the town's-people, for, when any one injures himself by his own violence, they call him "the bear with the tea-kettle."—[Capt. Kotzebue's New Voyages round the World in the Years 1823–1826.]

THE BLACK OR COMMON ELDER.—The virtues of the elder are but little known among us. In continental Europe it is used with success in many diseases. From Hippocrates down to the present time, we are told by the French Society of Naturalists, the elder has been employed in medicine. Every one knows, say they, its virtues and properties; they are not equivocal, for time and experience have confirmed them.

Its flowers are resolutive, anodyne and emollient. Infused and drank like tea, they provoke and establish perspiration in certain fevers, colds and catarrhs. Fried with eggs, they operate as a purge; applied as a fomentation in the erysipelas, they reduce the heat and irritation, and are excellent in all inflammations of the skin; warmed and applied to the forehead and temples, they cure the megrims. They are used in the vapor bath for swollen legs, particularly in the dropsy, in which disease the berries, inner bark and roots of this plant are used with effect as diuretics and purgatives. From the berries a *rob* or thick syrup is made, which is given with success in bowel complaints, particularly in the dysentery.

Its flowers give a fine perfume to vinegar, and to wine the flavor of muscat. Apples, when laid on a bed of the flowers of elder when dried, and then confined from the air, acquire an exquisite taste. A decoction of its berries dyes linen, after passing it through alum water, of a greenish brown color, and from them good brandy can be distilled.

An English farmer, in the county of Devonshire, at a season when the whole of vegetation was destroyed by caterpillars, grasshoppers and other insects, observed that the elder remained untouched, in full health and vigor. This induced him to make an experiment which was attended with perfect success. With boughs of the elder he went over his fields whipping and rubbing gently his turnips, cabbage plants, wheat, &c., which drove off all those noxious insects, and they never returned to their destructive work. The strong stinking scent of the plant destroyed the eggs of these insects. Since that time the process has been used with success on fruit trees, and all other plants when attacked by insects. Some boil the branches, leaves, &c. of the elder in water, and then sprinkle it over those plants and trees attacked by insects, which has the desired effect.

This shrub flowers in June; after picking the flowers and berries they should be dried in the sun, and then laid up in a clean place free from moisture, for medicinal purposes.

There are varieties of the common elder. Some plants have deeply indented leaves. The leaves of some are streaked with yellow, others with white, and some with yellow and white. Some bear white and others green berries. The elder is multiplied by seeds, layers, and slips. They take root rapidly when planted in slips, as do most plants having much pith.

Hedges of elder are common in some parts of Europe. They are impenetrable, of long duration, and not subject to the depredations of cattle, from their odor being very offensive to them. Sheep will sometimes eat them.

The wood of roots of the elder is used in Germany and France in making toys, sword canes, snuff boxes, fishing rods, combs, and other articles, and by cabinet-makers and turners. WM. LEE.—[N. E. Farmer.]

POULTRY.—The Edinburgh market is likewise supplied from many sources. The best of the common fowls come from the north side of the Forth. They are brought to town by carriers and higglers, who buy them from farmers and sell them to the dealers. *It is allowed that not one-third part of the supply is in a condition fit for the table*, and that no portion of it is of a good breed.

WRITINGS OF WASHINGTON.—In noticing some weeks ago these admirable volumes, published by Mr. Sparks, we referred to some of the early papers of Washington. Among these, written in his own hand, is a series of maxims under the head of "*Rules of civility and decent behavior in company and conversation.*" Of these there are 110. The only specimens published we extract, and agree with Mr. Sparks in the opinion, that "whoever has studied the character of Washington, will be persuaded that some of its most prominent features took their shape from the rules thus early selected and adopted as his guide."

1. Every action in company ought to be with some sign of respect to those present.

2. In the presence of others, sing not to yourself with a humming noise, nor drum with your fingers or feet.

3. Sleep not when others speak, sit not when others stand, speak not when you should hold your peace, and walk not when others stop.

4. Turn not your back to others, especially in speaking; jog not the table or desk on which another reads or writes; lean not on any one.

5. Be no flatterer, neither play with any one that delights not to be played with.

6. Read no letters, books or papers in company, but when there is a necessity for doing it you must ask leave. Come not near the books or writings of any one so as to read them, unasked. Also, look not nigh, when another is writing a letter.

7. Let your countenance be pleasant, but in serious matters somewhat grave.

8. Show not yourself glad at the misfortune of another, though he were your enemy.

9. When you meet with one of greater quality than yourself, stop and retire, especially if it be at a door, or any strait place, to give way for him to pass.

10. They that are in dignity or office have in all places precedency; but whilst they are young, they ought to respect those that are their equals in birth or other qualities, though they have no public charge.

11. It is good manners to prefer them to whom we speak before ourselves, especially if they be above us, with whom, in no sort, we ought to begin.

12. Let your discourse with men of business be short and comprehensive.

13. In visiting the sick, do not presently play the physician, if you be not knowing therein.

14. In writing or speaking, give to every person his due title, according to his degree and the custom of the place.

15. Strive not with your superiors in argument, but always submit your judgment to others with modesty.

16. Undertake not to teach your equal in the art himself professes: it savors of arrogancy.

17. When a man does all he can, though it succeeds not well, blame not him that did it.

18. Being to advise, or reprehend any one, consider whether it ought to be in public or in private, presently or at some other time, also in what terms to do it; and in reproving, show no signs of choler, but do it with sweetness and mildness.

19. Take all admonitions thankfully, in what place soever given; but afterwards not being culpable take a time or place convenient to let him know it that gave them.

20. Mock not, nor jest at any thing of importance; break no jests that are sharp biting, and if you de-

liver any thing witty and pleasant, abstain from laughing thereat yourself.

21. Wherein you reprove another be unblameable yourself, for example is more prevalent than precept.

22. Use no reproachful language against any one, neither curses nor revilings.

23. Be not hasty to believe flying reports, to the disparagement of any one.

24. In your apparel be modest, and endeavor to accommodate nature rather than procure admiration. Keep to the fashion of your equals, such as are civil and orderly with respect to time and place.

25. Play not the peacock, looking every where about you to see if you be well decked, if your shoes fit well, if your stockings sit neatly, and clothes handsomely.

26. Associate yourself with men of good quality if you esteem your own reputation, for it is better to be alone than in bad company.

27. Let your conversation be without malice or envy, for it is a sign of a tractable and commendable nature, and in all causes of passion admit reason to govern.

28. Be not immodest in urging your friend to discover a secret.

29. Utter not base and frivolous things amongst grown and learned men; nor very difficult questions or subjects among the ignorant, nor things hard to be believed.

30. Speak not of doleful things in time of mirth, nor at the table; speak not of melancholy things, as death and wounds, and if others mention them, change, if you can, the discourse. Tell not your dreams but to your intimate friends.

31. Break not a jest where none take pleasure in mirth. Laugh not aloud nor at all without occasion. Deride no man's misfortune, though there seem to be some cause.

32. Speak not injurious words, neither in jest or earnest. Scoff at none, although they give occasion.

33. Be not forward, but friendly and courteous; the first to salute, hear and answer, and be not pensive when it is a time to converse.

34. Detract not from others, but neither be excessive in commending.

35. Go not thither, where you know not whether you shall be welcome or not. Give not advice without being asked, and when desired, do it briefly.

36. If two contend together, take not the part of either unconstrained, and be not obstinate in your opinion; in things indifferent be of the major side.

37. Reprehend not the imperfections of others, for that belongs to parents, masters and superiors.

38. Gaze not on the marks or blemishes of others, and ask not how they came. What you may speak in secret to your friend, deliver not before others.

39. Speak not in an unknown tongue in company, but in your own language; and that as those of quality do, and not as the vulgar. Sublime matters treat seriously.

40. Think before you speak; pronounce not imperfectly, nor bring out your words too hastily, but orderly and distinctly.

41. When another speaks, be attentive yourself, and disturb not the audience. If any hesitate in his words, help him not, nor prompt him without being desired; interrupt him not nor answer him till his speech be ended.

42. Treat with men at fit times about business, and whisper not in the company of others.

43. Make no comparisons; and if any of the company be commended for any brave act of virtue, commend not another for the same.

44. Be not apt to relate news, if you know not the truth thereof. In discoursing of things you have heard, name not your author always. A secret discover not.

45. Be not curious to know the affairs of others, neither approach to those that speak in private.

46. Undertake not what you cannot perform; but be careful to keep your promise.

47. When you deliver a matter, do it without passion and discretion, however mean the person may be you do it to.

48. When your superiors talk to any body, hear them, nor neither speak nor laugh.

49. In disputes be not so desirous to overcome as not to give liberty to each one to deliver his opinion, and submit to the judgment of the major part, especially if they are judges of the dispute.

50. Be not tedious in discourse, make not many digressions nor repeat often the same matter of discourse.

51. Speak no evil of the absent for it is unjust.

52. Make no show of taking great delight in your victuals, feed not with greediness, cut your bread with a knife, lean not on the table, neither find fault with what you eat.

53. Be not angry at table whatever happens, and if you have reason to be so show it not, put on a cheerful countenance, especially if there be strangers, for good humor makes one dish a feast.

54. Set not yourself at the upper end of the table, but if it be your due, or the master of the house will have it so, contend not lest you should trouble the company.

55. When you speak of God or his attributes, let it be seriously in reverence and honor, and obey your natural parents although they be poor.

56. Let your recreations be manful, not sinful.

57. Labor to keep alive in your breast that little spark of celestial fire called conscience.

Liberal Courtesy.—By the annexed correspondence, it will be seen that the British Government, propose to present to each of the Institutions in the United States, enumerated below, a copy of a very valuable publication now in progress in England. This country is indebted much to Mr. O. Rich, an agent for the purchase of books in London, for his participation in this matter—and in the act of the British Government, we see with satisfaction a liberal and enlightened feeling of comity towards the United States.

London, Feb. 21st, 1834.

Sir—In consequence of your suggestion, that the Record Commission were desirous of presenting copies of their valuable publications to some of the Literary Institutions of the United States, I have the honor of enclosing herewith, a list of the principal Libraries where they would be most acceptable, and to which I shall have great pleasure in forwarding copies. I have numbered them according to their relative importance, in order that the Commissioners may be the better enabled to judge which to send to. Some of the latter numbers are inserted more on account of their *locality*, there being other Libraries of more importance, but situated in the immediate neighborhood of the Institutions mentioned in the first part of the list. It will be a great gratification to me to be the medium of transmitting to the United States, this noble mark of the liberality and good feeling of the British Government towards my country, and I feel confident that it will be productive of the happiest effects in drawing together the bonds of union between two nations more closely allied by natural ties than any other two on the face of the Globe.

With sentiments of respect and esteem, I have the honor to be, very sincerely, your humble servant,

O. Rich.

C. P. Cooper, Esq.
Secretary to the Record Commission, &c. &c. &c.

PUBLIC LIBRARIES.

1. The Philadelphia Library, Philadelphia, Pennsylvania.
2. The Boston Athenæum, Boston, Massachusetts.
3. The New York Society Library, New York.
4. The Charleston Society Library, Charleston, South Carolina.
5. The Baltimore City Library, Baltimore, Maryland.
6. The New York State Library, Albany, New York.

UNIVERSITY LIBRARIES.

14. The Library of Bowdoin College, Brunswick, Maine.
11. The Library of Dartmouth College, Hanover, New Hampshire.
7. The Library of Harvard University, Cambridge, Massachusetts.
12. The Library of Amherst College, Amherst, Massachusetts.
15. The Library of Brown University, Providence, Rhode Island.
8. The Library of Yale College, New Haven, Connecticut.
16. The Library of the College of New Jersey, Princeton, New Jersey.
The Library of the University of Virginia, Charlottesville, Virginia.
17. The Library of the University of North Carolina, Chapel Hill, North Carolina.
10. The Library of the College of South Carolina, Columbia, South Carolina.
18. The Library of the University of Georgia, Athens, Georgia.
19. The Library of the University of the State of Alabama, Tuscaloosa, Alabama.
13. The Library of Transylvania University, Lexington, Kentucky.
21. The Library of St. Louis University, St. Louis, Missouri.
20. The Library of the University of Ohio, Athens, Ohio.

New Boswell's Court, Lincoln's Inn, *February 22d*, 1834.

Sir—Being assured that his Majesty's Government and the Record Commissioners entertain sentiments in all respects corresponding to those which you recently stated to me were entertained by the United States towards the British Isles, I have had no hesitation in instructing his Majesty's Printers to prepare sets of the Record Publications for the *whole* of the American Libraries, mentioned in the list accompanying your letter of yesterday.

I am, Sir, your obedient humble servant,

C. P. Cooper.

O. Rich, Esq.

These Public Records, of which the cost for each sett is about *Two hundred pounds sterling*, consist of "the Statutes of the Realm," "Domesday Book," "Rymer's Collection," and other rare and ancient public documents, which, considering our descent, cannot but be of great value here, as consulting books.

[*From the Calcutta Quarterly Magazine and Review.*]

THE SONG OF THE FORGE.

Clang, clang,
The massive anvils ring
Clang, clang,
A hundred hammers swing,
Like the thunder rattle of a tropic sky
The mighty blows still multiply,
Clang, Clang.
Say brothers of the dusky brow,
What are your strong arms forging now?

Clang, clang—we forge the coulter now,
The coulter of the kindly plough:
Sweet Mary mother, bless our toil;
May its broad furrow still unbind
To genial rains, to sun and wind,
The most benignant soil.

Clang, clang—our coulter's course shall be
On many a sweet and sheltered lea,
By many a streamlet's silver tide,
Amidst the song of morning birds,
Amidst the low of sauntering herds,
Amidst soft breezes which do stray
Through woodbine hedges and sweet May,
Along the green hill's side.

When regal autumn's bounteous hand,
With widespread glory clothes the land,
When to the valleys, from the brow
Of each resplendent slope, is rolled
A ruddy sea of living gold,
We bless, we bless THE PLOUGH.
Clang, clang,—again, my mates, what glows
Beneath the hammers' potent blows?
Clink, clank,—we forge the giant chain,
Which bears the gallant vessel's strain
'Midst stormy winds and adverse tides;
Secured by this, the good ship braves
The rocky roadstead, and the waves
Which thunder on her sides.

Anxious no more, the merchant sees
The mist drive dark before the breeze,
The storm cloud on the hill;
Calmly he rests, though far away,
In boisterous climes, his vessels lay,
Reliant on our skill.

Say, on what sands these links shall sleep,
Fathoms beneath the solemn deep:
By Africa's pestilential shore,
By many an iceberg, loan and hoar,
By many a palmy western isle,
Basking in Spring's perpetual smile;
By stormy Labrador.

Say, shall they feel the vessel reel
When to the battery's deadly peal
The crashing broadside makes reply;
Or else, as at the glorious Nile,
Hold grappling ships, that strive the while,
For death or victory?

Hurrah—cling, clang—once more, what glows,
Hark, brothers of the forge, beneath
The iron tempest of your blows
The furnace's red breath?

Clang, clang—a burning shower clear
And brilliant, of bright sparks, is poured
Around and up in the dusky air,
As our hammers forge the SWORD.

The sword!—extreme of dread; yet when
Upon the freeman's thigh 'tis bound,
While for his altar and his hearth,
While for his land that gave him birth,
The war drums roll, the trumpets sound,
How sacred is it then!

Whenever for the truth and right
It flashes in the van of fight,
Whether in some wild mountain pass,
As that where fell Leonidas;
Or on some sterile plain and stern,
A Marston, or a Bannockburn;
Or amidst crags and bursting rills,
The Switzer's Alps, grey Tyrol's hills;
Or, as when sunk the Armada's pride,
It gleams above the stormy tide;
Still, still, whene'er the battle word
Is Liberty, where men do stand
For justice and their native land,
Then Heaven bless THE SWORD!

GEESE.—Cobbett says, "water for goslings, or for the geese to *swim* in, is by no means *necessary*, nor perhaps even *useful*. Or how is it that you see such fine geese all over Long Island, where there is scarce such a thing as a pond or a run of water."! Mr. C., we presume, travelled no further on the Island than to the Hempstead plains, otherwise he would not have said brooks, ponds, and creeks, were so scarce.

YOUNG DUCKS.—These are said to be injured by being allowed free access to brooks and ponds. Animal food is nourishing to them.

SALSIFY OR VEGETABLE OYSTERS, *Tragopogon porrfolius*.—This plant, which is known by the several names of salsify, vegetable oyster, and goat's beard, is often confounded with that of the scorzonera hispanica, garden scorzonera or viper's grass.

The Salsify is a deciduous, herbaceous, biennial plant, with a long, tapering, white root; parsnip shaped, with a white milky juice, and mild sweetish flavor. It has long been cultivated in gardens, for the sake of the roots, which, when cooked, have much the flavor of oysters.

The leaves of the plant somewhat resemble those of the leek, being smooth, green, and pointed. The second year the seed stalk rises three or four feet high, producing flowers of a dull purple color, which are followed by seeds, surmounted by a crown of downy substance, somewhat resembling the common thistle.

Were the valuable properties of this plant more known, it would be more extensively cultivated in gardens, particularly in the inland parts of this country.

It is thought impossible, by many, that a plant should be cultivated which should bear any resemblance, in flavor, to oysters; but all who have tasted salsify, when properly cooked, must not only acknowledge that there is a resemblance, but that this root is a good substitute for the marine production.

The manner of cultivation is precisely the same as that of parsnips; and roots which are not wanted for fall and winter use, may be allowed to stand in the ground in the same manner for spring use.

They are cooked in all the different ways as oysters. When they are intended to be fried in butter, they should be first parboiled, the skin taken off and sliced; the same for stewing, or they may be mashed. They impart a fine flavor to the stuffing for fowls.

There is an annual plant, which belongs to the same class with the salsify, and which very much resembles it, both in leaf and seed, the seeds of which are, sometimes, through design or mistake, sold for salsify seed. It is the *Geropagon glaber*, or old man's beard. It is not worth cultivating.

Scorzonera, or *Viper's Grass*, also belongs to the same class with salsify, but is a perennial plant, with a deciduous, herbaceous top, which grows to about the same height as salsify, but has yellow flowers, which are followed by seeds not unlike those of salsify. The root bears a resemblance also, but is not counted as profitable. The leaf of Scorzonera somewhat resembles that of the plantain.

☞ A PECULIAR BREED OF SHEEP IN THE NEPAL COUNTRY.—The huniah is a large, tall breed, with slender, compressed, spirally-twisted-horns, and short narrow tail. Though now naturalized in the Kachar, it is of trans-Himalayan origin. The color is almost invariably white. Individuals of this specie are apt to have three, four, and even five horns. The huniah cannot bear the heat of Nepal south of the northern division, and will doubtless flourish in England, where the experiment is making of naturalizing it. Its wool is superb.—[Journal of the Asiatic Society of Bengal.]

SAGACITY OF THE HORSE.—We learn that several horses were on board of the Wm. Penn at the time of the conflagration. Among them was one noble animal, who, when the flames spread, appeared to be completely conscious, not only of his danger, but that his only dependence was on human aid. He followed Capt. Jeffries, who was the last to leave the boat. At every movement of the captain the intelligent animal was at his side, manifesting, with singular intelligence, his apprehension and dependence on the aid of Capt. Jeffries. The latter at length noticed him, and leading him to the side of the boat said, "my noble fellow, you must leap this railing or be lost." To the surprise of the captain the animal appeared to understand him, and leaping the rail plunged into the river, swam to the shore and escaped.—[Phil. Intel.]

METHOD OF DRESSING SKINS PRACTISED IN MAROCCO.—The following account of the method practised in dressing skins in Marocco was transmitted to the Zoological Society by W. Willshire, Esq., a Corresponding Member of that Society, in a letter dated Mogadore, May 5, 1833. Its results are stated to be excellent, as regards the preservation and color of the fur, and the flexibility of the pelt.

Wash the skin in fresh water to deprive it of the salt; as soon as this is done, scrape the flesh off, when take two pounds of alum, one quart of buttermilk, and two or three handfuls of barley-meal, which mix well together, and lay on the fleshy side of the skin equally; fold up and press it together carefully, and let it lie two days. On the third day take it to the seaside, wash the skin well, and when clean and free from mixture, hang it up to let the water run from it: then take two pounds of alum finely powdered, and throw or spread it equally on all parts of the skin; again fold up as before, and allow it to lie three days, when it will be in a proper state to dry in the sun, laid flat, without taking away the powder. When it is dry, take a pint or two of fresh water, and sprinkle it upon the skin, and again fold it up carefully for about two hours, to imbibe the water; then lay it on a table, and, after scraping it free from the mixture and flesh, take a sand-stone (rather rough) and rub the skin well until it becomes soft and pliable, then hang it in the shade to dry. The process is then complete.

When the skin is perfect, having the head, horns, &c. take off the horns, and fill their cavity with a mixture of equal parts of powdered alum and ashes of charcoal dissolved in water, and expose them two days to the sun. Saturate the trunks of the horns with eight ounces of alum dissolved in water, and fold up with the skin, and apply the same on each occasion when employed in curing the skin. The flesh on the head and jaws to be carefully taken off, filling the same with powdered alum. It should remain in the sun until perfectly dry.

In addition to the foregoing description of the mode used in Marocco, in dressing skins, as related by the persons employed by Mr. Willshire, it may be well to observe that the process does not take so long at Mogadore, as Mr. W. has often received back skins of the Aoudad and Leopard from the dresser, on the third or fourth, and never exceeding the fifth day, perfectly cured. Allowance has been made by the dresser, in the foregoing description, for the difference in the climate of London.

The skins of smaller animals must not be subjected to so lengthened a process, or they will become harsh, and the pelt impoverished. —[Proceedings Zoolog. Soc.]

INFLUENCE OF COLOR ON THE ABSORPTION OF HEAT AND OF ODOROUS PRINCIPLES.—On the 20th of June, 1833, a paper was read before the Royal Society, "On the Influence of Color on Heat and Odors," by James Stark, M. D., of Edinburgh; of which the following is an abstract.

The author observes, that the only experiments on record relating to the modifying effect of different colors on the absorption of heat from solar light are those of Franklin and Sir H. Davy. In order to investigate this subject, the author employed pieces of wool, silk, and cotton, which were wrapped round the bulb of a thermometer placed in a glass tube; the tube was then plunged into boiling water, and the time which elapsed during the rise of the thermometer from one given point to another was accurately noted. Other experiments were also made with an air-thermometer, of which the bulb was coated with various colored materials, and heat thrown on the ball by means of polished tin reflectors from an Argand burner. The results accord very nearly with those of Franklin and of Davy; the absorbing power with regard to different colors being nearly uniformly in the order of black, brown, green, red, yellow, and white. The author next investigates the differences which occur in the radiation of heat by differently colored substances; a subject on which he is not aware that any experiments have ever been made previously to his own. The mode of ascertaining the amount of radiation was generally the converse of that by which the absorption of heat had been determined: namely, by exposing the colored substances, in contact with a thermometer, to cooling instead of heating processes. The general result of all his experiments was, that the loss of caloric by radiation follows exactly the same order, with regard to the color of the radiating surface, as its absorption. In the second part of his paper the author gives an account of a course of experiments which he made with a view to discover the influence of color on the absorption of odorous effluvia, and more especially in the case of the absorption of the fumes of camphor and assafœtida by woollen cloth of different colors. Black cloth was always found to be possessed of the greatest absorbing powers, and white of the least; red cloth being intermediate between them. Cottons and silks gave, on trial, precisely the same results, which were further confirmed by the different weights acquired by these substances from the deposition of camphor upon them.—[Proceedings of the Royal Society.]

DOMESTIC RECIPES.—*Dressing Meats*—Wash all meats before you dress: if for boiling, the color will be better for soaking; if for roasting, dry it. Boiling in a well flavored cloth, will improve much the appearance. The pot should be skimmed the moment it boils, otherwise the meat will have a foul appearance.

The boiler and all utensils should be kept delicately clean; they will otherwise communicate a bad flavor to the meat.

Meat should be boiled slow, or it will be hard; weigh the joint, and allow a quarter of an hour to each pound, and about twenty minutes over.

Beef Cakes—Make fine some beef that is rare done, with a little fat bacon; season with pepper and salt, and otherwise as preferred; mix well and make into small cakes three inches long, and half as wide and thick, and fry them a light brown, and serve with gravy.—[Northern Farmer.]

To preserve Cheese—If you have a greater quantity of cheeses in the house than is likely to be soon used, cover them carefully with paper, fastened on with flour paste, so as to exclude the air. In this way they may be kept from insects for years. They should be kept in a dry, cool place.

Woollens should be washed in very hot suds and hot rinsed. Luke-warm water shrinks them.

Suet and lard keep better in tin than in earthen vessels.

Suet keeps good all the year round if chopped and packed down in a stone jar, covered with molasses.

See that the beef and pork are always under brine; and that the brine is sweet and clean.

Horse-Radish in Milk.—A spoonful of horse radish put into a pan of milk, will preserve i sweet for several days.

Preparation of Beet Sugar. By Dr. F. WURDEMANN. Being an extract of a letter from Dr. Wurdemann, of this city, now in Paris, to Dr. Ravenel, and communicated by him for publication in the Southern Agriculturist.

"PARIS, December, 1833.

"The beets are collected when ripe, or little before that time, and immediately brought to the cleaning machine. This consists of a cylinder composed of rills of wood, and revolving in a trough filled with water; into this cylinder, the beets with their tops, as torn from the ground, are put, and thoroughly washed; one objection to cutting off the tops before washing, is that a quantity of saccharine matter escapes. They are then brought to the rasping machine, which breaks down their cellules, and reduces them to fine pulp. In some places the beets are brought dried to the manufactory. They should then be cut in tranverse slices, and dried in a stove heated somewhat below the temperature of boiling water, that being sufficient to destroy the principles of organic life in the beet, and which militates against the action of affinity present in all inorganic substances. The temperature should be below 112 degrees of Fahrenheit, as it appears that at that point the coloring matter is formed readily, either from a re-action taking place between the principles contained in the beet, or during the maceration, from the water used in that process. For the same reasons the time and degree of heat used in maceration should not exceed that requisite to extract the saccharine matter.

The quantity of fibrous matter contained in the beet is so small, in proportion to the liquid, and the cellules containing the latter are so minute, that it requires a most complete rasping to prepare them for the press. The presses most esteemed are those which press but a small quantity at a time, and that with expedition; as by these means most juice is obtained from the pulp. They are of two kinds, the screw and the hydraulic; but the limits of this paper will not permit me to give you a description of either; suffice it to say, that the pulp, having been placed in strong, closely woven cloth, is submitted to these presses, and the juice flows immediately into cauldrons, (coppers,) in which it undergoes the process of defecation. From good beets Dombasle obtains 85 per cent. of juice; from good and indifferent, 60 per cent. is usually got. From boiling them and then cutting them in slices, over which a current of water flows successively, he has obtained 90 per cent.; 60 lbs. of juice of good white beets yield from 4½ lbs. to 5 lbs. of raw sugar; those grown in rich wet soils give less.

The juice thus, or otherwise obtained, is subject to a spontaneous alteration, which is important to know. If exposed to the atmosphere, it gradually acquires a stringy and oil-like consistence, which, increasing in proportion to the evaporation of the liquid, at last resembles that of the white of an egg. These changes take place in less than twenty-four hours, when the temperature is at 20 degrees to 24 degrees *centigrades*. The mass which before this change never showed any free acid, now contains both *acetic* and *nanceique* acids, (the latter described by Braconnet in 1813—*Annales des Chimie.*) It is supposed that this alteration takes place in the beet itself when kept in too large heaps, and thus subjected to too high a temperature. It is the formation of this viscous matter which presents a great obstacle to the crystallization of the sugar, and which, gluing together the crystals, prevents the molasses escaping. To guard against this alteration of the juice, the utensils used in keeping and stirring the beet juice should be kept scrupulously clean, and the greatest celerity possible should be used in all the necessary operations, from the grinding to the defecation. The instruments of wood must be frequently washed with the greatest care, and when laid aside, should be covered with milk of lime, and which should not be removed before their immediate use is required. One of the best means to prevent this alteration in the beet juice is to employ small coppers, capable of containing about two hectolitres (two hundred English quarts) each; five of this size are capable to serve for the fabrication of 30,000 lbs. of beet juice per diem. Although the heat may be applied to a large copper long before it is filled from the juice flowing from the presses, too much time passes before it is full, and arises at the temperature of 70 or 80 degrees centigrades, at which temperature the juice may be considered safe from the alteration above mentioned.

I will not dwell on the *modus operandi* of the substances used in the defecation of the juice, but proceed, at once, to state the process most generally adopted. The quantity of lime varies from 2½ to 3½ "*grammes*" for each "*litre*" (quart) of the juice. As a general rule, the quantity must be increased in proportion to the quantity of saccharine matter contained in the juice. The purest lime should be used, and in its greatest degree of causticity, and it should be reduced into a clear pap by means of a little water before put into the coppers. It is best to put it in the copper as soon as a few buckets full of juice have flowed in, it acting in preventing the decomposition already so much insisted on, which is apt to take place to a more or less great degree before the juice arrives at the requisite degree of temperature.

Two methods are now used to complete the operation. One consists in preventing the boiling of the juice, by extinguishing the fire before it arrives at 100 degrees temperature, and then being left at rest for half an hour, when the scum rises to the surface; the liquid is afterwards drawn off by a cock placed near the bottom of the copper.

The method preferred by Dombasle is to continue the fire under the copper, and, when near the boiling point, watch the *first bubble* which swells under the scum; immediately take a ladle full of the juice from the spot where it arises, and pour on the spot a quart of cold juice, which checks the action immediately; the same operation must be repeated as often as a bubble appears, (which must never be permitted to burst and spread over the scum,) until, by examining the liquor taken up in the ladle, the defecation is found complete, when the fire must be extinguished, and the liquor allowed to rest for a half hour before drawn off; always guarding the bubbles, which may continue to rise, from bursting by the means already indicated. By this method, the operator is rendered complete master of the work, and in those cases in which sufficient lime has not been used, he can have time to add more when he finds that complete defecation will not take place. For this purpose he has only to dilute a quantity of the milk of lime in the cold juice, which he pours into the copper. Even the introduction of the cold liquid alone sometimes produces a remarkable effect: a single quart changing the state of the liquor and causing the separation of the fæces in large flakes. The complete defecation is known by the liquid in the ladle being of a fine white wine color, and perfectly transparent, and that the fæces are divided into large flakes, which settle quickly to the bottom of the ladle. The liquor having been drawn off, the scum and residue are then placed on cloths extended over a table composed of wooden ribs, and having an elevated border; below this is placed an inclined plane, which conveys the juice into a reservoir containing the rest of the clarified juice. The cloths should be of cotton in preference to wool, which the lime, still retained by the fæces, is apt to rot.

Now, place the juice thus defecated into coppers destined to concentrate it. The form of the different coppers is not an unimportant object. Those used in defecation should be deep, viz. the depth half their diameter; and when bullocks' blood is employed in defecation, they should be as deep as wide. The coppers for concentration should be as wide as one foot in depth to four or five feet in diameter, those for cooking differ from these last only in having their bottoms three "*lignes*" in thickness at least. The combustible matter is pit-coal or wood, and the furnaces must be adapted to each. Animal charcoal is used in the concentration; that made from bones and not horns is employed. Its action is not confined to removing the color, but it acts also in an inexplicable manner, enabling the syrup to support a higher degree of temperature; and without it, it is almost impossible to cook the syrup on an open fire, which process will now be described.

Place the clarified juice into the concentrating coppers, and saturate the excess of lime, if it exist, by diluted sulphuric acid; it should not be rendered completely neuter, only so far that the purple (tournesol) paper changes slowly blue. Then pour in the animal charcoal in the proportion of 1½ lbs. to a "quintal" (100 lbs. weight) of the liquor. Boil and continue the concentration until the hot liquor supports (porte) 20 degrees *a l' areometre de Baume.* It is then withdrawn and left to deposit in deep wooden vessels, and kept in a cool place, where it precipitates during cooling a great quantity of calcareous salts, among which the malates are most abundant. When the syrup is perfectly clear, (at the end of twenty-four hours usually,) it may be submitted to the action of cooking (cuite.)

Being placed in the cooking coppers, carry it by a brisk fire to 32 degrees of *areometre* of *Baume.* Extinguish the fire, and throw in animal charcoal, in the proportion of ¾ lbs. to a quintal of the juice which has furnished the syrup, viz. half the quantity employed the first time. Let the syrup now cool to about 75 degrees, stirring it occasionally to mix the charcoal well with it; then carry it into the clarifying coppers, and submit it to the usual clarification of bullock's blood; it is then drawn off clear and the cooking proceeded with. The scum, &c. is placed on woollen cloths to drip. The preceding is considered the most difficult part of the process. The cooking coppers now receive it, and the point of concentration is told by touching the ladle dipt in the syrup and drawing out the thread. The thumb being below, when the finger is drawn from it, the thread should break at the thumb. The thermometers used for this purpose are rejected by M. Dombasle, as not to be relied on. When of the proper consistency, it is poured out into the "rafraichissoir," where it crystallizes.

The method recommended by Payer is to evaporate the *defecated* juice to twelve degrees of Beaume, without adding any animal charcoal; then draw off all the liquid into a filter filled with animal charcoal; evaporate *rapidly* the filtered liquid to twenty-five degrees of Beaume, and filter again through a filter of Dumont with fresh animal charcoal. The syrup is thus rendered ready for the cooking, it yields more crystals of a more beautiful hue, and the suppression of the bullock's blood no longer leaves a portion soluble and alterable. Payer recommends also the copper on a pivot for *cooking* the clarified juice, it (cooking) being in this accomplished in five or eight minutes, while the other method requires thirty or thirty-eight minutes; moreover, the alteration is six times less in syrup cooked in this than in the usual stationary coppers. The fire being brisk, the ebullition is commenced in one minute in every part of the copper; frequently the syrup is too viscous, and rises in a thick froth, and, incompletely wetting the bottom of the boiler, hazards the burning of the sugar; to check this instantaneously, throw in a small quantity of fresh butter, four or five *grammes*, which Dombasle recommends to have been previously melted, as that operation prevents the sugar receiving any flavor from it; as soon as the syrup, by means of the touch, is found cooked, draw the cord, and thus canting the copper, its contents pour out at once; open the stop cock, and proceed with the process; seven or eight products being thus united in the rafraichissoir, it is rolled into the rooms containing the forms, for much of the French beet sugar (raw) is in loaf form.

I have thus, my dear sir, given all the inform-

ation I possess relative to the manufacture of beet sugar from the expression of the juice to the crystallization. I have drawn freely from the latest and most esteemed works, but as yet have not been in a refinery. I thank you for the hint, how I may render my stay here serviceable to my native city; and shall use my endeavors to gain admittance into a refinery before my return.

I am, with great regard, dear sir, yours, very respectfully, F. WURDEMANN.

RETURN OF SPRING: *Mr. Editor*,—Please insert the following from the Lansingburgh Gazette. It is not inappropriate to your July number, since spring delayed her coming so long.

Hail, ever welcome season! We greet thy return as that of a long-loved absent friend, from whose presence we anticipate a renovation of the most refined, delightful pleasures, rendered still more grateful by protracted absence and contrast with the cold formality of heartless pretenders. None but a heart tremblingly alive to the beauties of nature can know how delightful it is to watch the progress of the expanding bud, and listen to the notes of "earliest birds." There is a *witching* in the warbling of spring's *first* songsters, and a peculiar charm in the delicate tints of earliest flowers, which exists *not* in those of other seasons. The fragile anemonie and blue-eyed violet (sweet emblems of humanity) speak *volumes* to the heart of nature's florist—his affections seem to expand as he observes the first unfolding blossom, the silent work of the putting forth of leaves, the graceful curve of the delicate stem, and exquisite grace with which it bends and trembles in the evening breeze. Does he wish to possess remembrances of these when the originals shall have withered? He sallies forth with his pencil and port-folio, selects the most graceful and perfect specimens, and observes with accuracy the most trifling tint and feature. In the delineation, he is particularly careful to preserve the "line of beauty" which communicates a flowing sweetness, and imparts an ease to the drawing of a single flower, and grace to a bouquet. The pursuit is eminently calculated to refine and elevate the heart, and should rank among our highest intellectual enjoyments. For while we admire, we involuntarily lift the "mind's eye" from "nature up to nature's God;" in him we see the great, *grand* Architect of all —He wields the sceptre, and the vast *universe obeys*—at his command the tumultuous elements are hushed to harmony, the earth is clothed in verdure, and man, the least coincident, appears, recedes, and disappears! S.

PLOUGHING IN GREEN CROPS.—I have found by experience, that when a spring crop is taken off, and wheat is to follow, the best method is to harrow thoroughly, immediately, which causes all the seeds of grain which may have scattered, or of weeds, to vegetate. About two weeks before seeding, turn all the green stuff and stubble under the soil, there to remain and rot. If ploughed the second time, much of the stubble is brought to the surface and lost.—[Genesee Farmer.]

A NOVEL LAW POINT.—The Supreme Court of Massachusetts, at its late session in that city in March, decided that a grand child born eight months and a half after the death of his grand-father, is included in a bequest to grand-children "*living at his decease.*"

APPLES FOR OXEN.—Last season a widow lady residing in New-Jersey bought a pair of working oxen for $55. She had them fed on apples and grass, with the addition of four or five bushels of ears of corn. She sold them in the fall to the butcher for $94. The apples were the kinds of which the best Newark cider is made.

CULTIVATION AND MANAGEMENT OF THE TOBACCO CROP.—Having an increasing number of subscribers in the southern states, we deem it due them to occupy a portion of our pages, even to their exclusive benefit.

To the Editor of the Farmer and Gardener.

SIR—To enable us to answer the numerous inquiries, which are constantly made relative to the cultivation of tobacco, we requested an extensive and highly intelligent planter (of whom we have received ten varieties of seed of the choicest Maryland sorts) to give us his views relative to the proper mode of cultivation and management.

We have the pleasure of enclosing his remarks on the subject. If you think them worthy a place in your valuable paper, publish them; the result may prove useful to your numerous subscribers. Respectfully, yours, SINCLAIR & MOORE.

Baltimore, May 20, 1834.

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The ground is prepared as you would for cabbage seed; in addition, it is always, when taken from new ground, burnt by placing a quantity of brush upon it, then set on fire, for the purpose of cleansing it from all filth. The repetition of burning may be avoided by always weeding up the bed after you are done with it for the season. The *quantity* of seed required is about a wine-glass full to ten yards square; but in this we differ in practice very much—we know if we could be certain it would always come, that this quantity would be enough; and as it is uncertain, we most always sow three times as much, with the calculation, should it be too thick, to rake out the over quantity. This raking is of rather a recent date, and is done by a small rake made of 10d. nails, put about five-eighths of an inch apart, with sharp points; and it is used with a little slight of hand, so as to divide the plants without leaving them in rows. This operation is performed when the plants are about the size of a five cent piece, which is usually in the early part of May, and just before we think of planting.

Planting is usually done from the latter part of May to the 10th of July; here again I must refer you to the mode of preparing and planting cabbages in hills. The *size* of the plants, about three inches broad, are the best size to plant out; when transplanted they are also cultivated very much as cabbages, only oftener worked with the plough and hoe.

Usually, in the middle of August, tobacco will signify its approach to ripening by buttoning and blossoming, at which time we quit working it, and proceed to break off the blossoms to such a leaf as we think will ripen as soon as the bottom leaf, (which we call topping tobacco); after this it will commonly put out suckers just above the joints of the leaves, these must be broken off, and then we think it time to house. *Cutting* and *housing:* This is done with a similar instrument to a butcher's cleaver. After it is cut it may lay for a little time, until the leaves fall and will not break by handling.

From the ground it may be taken in large loads to the tobacco house, where it is usually pegged (a wooden peg six inches long is driven into the butt, by which it is hung on the sticks in the house,) but sometimes split; this is done by a knife, splitting the stalk down nearly to the butt, before it is cut down in the field, and when brought to the house it is straddled across the sticks, iustead of being hung on them by the peg. The sticks are placed on the bearers in the house about six inches apart, the plants put from four to six inches apart, according to the size, where it is cured either by fire or suffered to cure by the air. It is considered cured when the stem of the leaf is dry. *Stripping* comes next; for which we choose moist weather, the only time it can be handled without crumbling, and tie it in bundles, from which it is generally put in bulk and watched that it does not heat; after which the bundles are straddled across the sticks for *conditioning* to pack; here it must be noticed that the bundles get completely dry, and then as soon as moist weather again enables you to handle it, it must be taken down and put in large bulks and weighed; this is called *close bulks*, here it is ready for packing; that process is so generally known that I do not deem it necessary here to say any thing about it.

The kinds. Tobacco is esteemed mostly for two reasons, one for *quality*, the other for *quantity*. It is supposed the thinner jointed tobacco generally cures the brightest, but I do not entirely subscribe to this opinion, as I have often seen the thick jointed of as good color. Am inclined to think there is more in the soil than in the kinds; a poor hickory soil will produce a good color, when I have seen such black soil produce very dull tobacco; but as a general rule, give me the thick jointed sort, and upon tolerable strong loam. Rich stiff soil will not produce a bright crop, but will give a heavy crop; quite sandy soil, on the other hand, is likely to produce bright, but a light crop. So, upon the whole, I should prefer the thick jointed tobacco, and upon a loomy soil of pretty good strength, to produce the most profitable crop.

Tobacco is a very troublesome crop; it never being off hand. The seed of the new is sown before the old crop is packed and sent to market. It is subject to many enemies, among them the fly in the bed and in the field; when small, the ground worm, the bud worm, the web worm, and lastly, and most destructive, the horn worm; these come in immense quantities, and are similar to the Tamata worm. They will, from the eggs laid upon the leaves, grow in a few days as large nearly as your finger, and will, in a short time, leave nothing of the plants but the stems and stalk. These worms are the common enemy; they commence with the first growth of the tobacco, and at different periods follow it up until the crop goes to the house. *Our plan* of defence is to pick them off by hand, or use turkeys; they are best, because more expeditious. Turkeys, by driving them into the tobacco, will regularly examine each plant and pick them off.

I neglected in its place to say what time the seed should be sown—from February to the first of April is the best time; and the quantity raised per acre is generally one thousand pounds from 3,500 to 5,000 hills, according to the quantity of land.

CUTTING GRAIN BEFORE RIPE.—For seed we believe it is recommended to let wheat become fully ripe. For flour, Mr. M'Culloch says,

"I had my wheat field cut about ten days sooner than the residue—it was kept separate, and when recently brought to the mill, with the wheat cut from the same field at the usual time, the early cut wheat weighed two pounds to the bushel heavier than the other. The flour made from it (there were ten bushels) is remarkably fine, equal to any I ever had in my family, and superior to any I have had this year from any other wheat. I think it proper to make these facts known; although I would not say that a single experiment like this ought to establish a general rule.

"T. G. M'CULLOCH."

USE OF MARL.—A correspondent of the Baltimore Farmer and Gardener thus speaks in favor of this manure:

I have been favored with the use of this mineral, as a manure, for more than twenty years, in neighboring states; and have, in many instances, witnessed the most wonderful improvement from its application. There is a great variety in the composition of this article; all of which require a corresponding difference in the component parts of the soil to which it is to be applied, for profitable results. He who goes to work with this manure without a knowledge of the composition of either his soil or his marl, will but flounder in an uncertain ocean of wild "experiment," and in many instances may expect to lose both his labor and his "deposites."

In New-Jersey there are three principal strata of this substance, differing materially in their composition, and in their adaptation for particular soils. The first stratum lies near the Delaware, is met with along the banks of creeks, and in the bottoms of wells—in one instance within my knowledge, it was penetrated nearly one hundred feet; but without going through the layer. This abounds with a large proportion of shells, and other fossil remains. The second stratum, farther up the country, has fewer shells, of a black color, and is granulated, by reason of which it has obtained the name of gunpowder marl. The third stratum lies still farther up the streams, and bordering on the regions of pines—this species strongly impregnated with sulphurous acid; so much so, in some instances, as to corrugate, and even excoriate, the cuticle on the hands of the laborers in the pit—has no undecomposed shells, color black, green, and sometimes blue, which has been used as a pigment for painting. I was acquainted with one tract of land which abounded with this latter species of marl, and was rendered almost entirely barren. With the exception of here and there a scrubby white oak, the soil was almost as bare as the beaten pathway. It had not been thought to be worth the expense of an inclosure, until it fell into the hands of a gentleman who understood something of the science, as well as the art of agriculture, and knew how to appreciate the value of a retort in the hands of a ploughman. On discovering the composition of his sterile soil, he knew how to apply the appropriate remedy, and after inclosing a lot, it was ploughed deeply, dressed with a coat of the hydrate of lime, and laid down to clover; and a finer crop of that valuable grass I never witnessed. Here the uncombined acid of the soil, uniting with the calcareous matter, formed the sulphate of lime, or plaster of Paris, which enters largely into the composition of clover, and forms its proper nourishment.

At this cheap rate, was this barren waste converted into a rich and beautiful meadow; not exceeded in value by any bottom meadow within my knowledge.

Had marl of the first mentioned species been applied to this land, it would have produced the same effect, in proportion to the quantity of undecomposed calcareous matter which it contained. The second species would have produced little or no effect; but had the last mentioned kind been used, it would have been like adding fuel to the flame, and would have rendered the sterility more lasting and obstinate. It was refreshing to witness the effect of this blooming spot, surrounded by the dreary waste. It could only be compared to the effect on the famished caravan, when, traversing the blowing sands of Arabia, he descries in the horizon the lonely palm tree, marking the site of a solitary spring of water.

COLT FROM A MULE.—We mentioned, a few days ago, a singular freak of nature, that a female mule belonging to a gentleman in Suffolk had proved with foal, and actually brought forth. The fact being doubted by several gentlemen here, we have thought it worth the trouble to inquire more particularly about it, and have now before us a letter from the proprietor of the mule, (J. T. Kilby, Esq.) fully confirming our statement, and giving the following particulars: The mule was kept constantly at hard labor, except on Sundays, when she was turned into a pasture in which was a two year old horse, between which and the mule an intimacy was contracted, which led to the result we have alluded to. The issue of the mule at the delivery was so poor and feeble, that for some time it could not stand; but it soon began to thrive, and is now in fine order. It approximates nearer to the horse than the mule species. The proprietor of the mule, though he had remarked her increased bulk, little imagined the true cause, but believed it to have proceeded from over-feeding, and continued to keep her constantly at work, up to the very moment of parturition, the signs of which actually occurred while the animal was in gear! Of course he was not a little surprised and puzzled at the discovery, as well as hurt at the reflection that he had unwittingly subjected her to laborious duty, contrary to the laws of nature and the dictates of humanity.

The dam and her youngling are kept in a clover lot, and looked after with the utmost care and tenderness. They attract a great many visiters, from the generally received opinion that mules are incapable of breeding. It is curious to observe the fondness and solicitude of this creature for her offspring; she will allow no one to go near it, nor even to approach the fence, without flying at them like a virago, with looks which seem to say "begone! if you know when you are well off." She is of a grey color, ten years old this spring, out of a Dixson mare, by a small jack which belonged to Messrs. Cohoon & Milton, of Nansemond county.—[Norfolk Herald.]

MURRAIN.—A draught of alum and sulphur has been found a remedy for bloody murrain arising from cattle swallowing leeches.

CEMETERIES.—Numerous communications have appeared in the previous volumes of the N. Y. Farmer on the subject of cemeteries, particularly in reference to having one in this city. Some steps have been taken to accomplish the object by a wealthy citizen; we hope he will persevere. Now is the season to feel the want of a rural cemetery. The following is from the Boston Advocate:

A magnificent plan of a rural cemetery, after the manner of Pere-la-Chaise, and our own beautiful Auburn, has been commenced and is in progress in England.

It is called the Great Western Cemetery, situated at Notting Hill, just beyond Kensington Gardens, two miles from London. The capital is £31,500, divided into shares of £21 each. Half shares at £10 10s. each. This is more liberal than the plan of the cemetery at Auburn, where $60 is the price of a share, and no half shares are sold. The Notting Hill Cemetery is managed by 24 directors. Holders of five shares are qualified for the direction, and joint holders of 100 shares may nominate a director.

The grounds embrace *fifty-two acres* in extent, equi-distant from Oxford street and Picadilly. Twelve acres have been already enclosed and adorned with magnificent trees and beautiful shrubbery. Two hillocks, with ancient trees, are preserved. The rest of the estate is at present let as a farm. The spot is represented to be capable of becoming equal in extent to the famed Pere-la-Chaise, near Paris. We heard a gentleman, recently from Europe, remark the other day that the natural advantages of the cemetery at Auburn were incomparably superior to all that nature had done, or art could do, for Pere-la-Chaise. Notting Hill he had not seen.

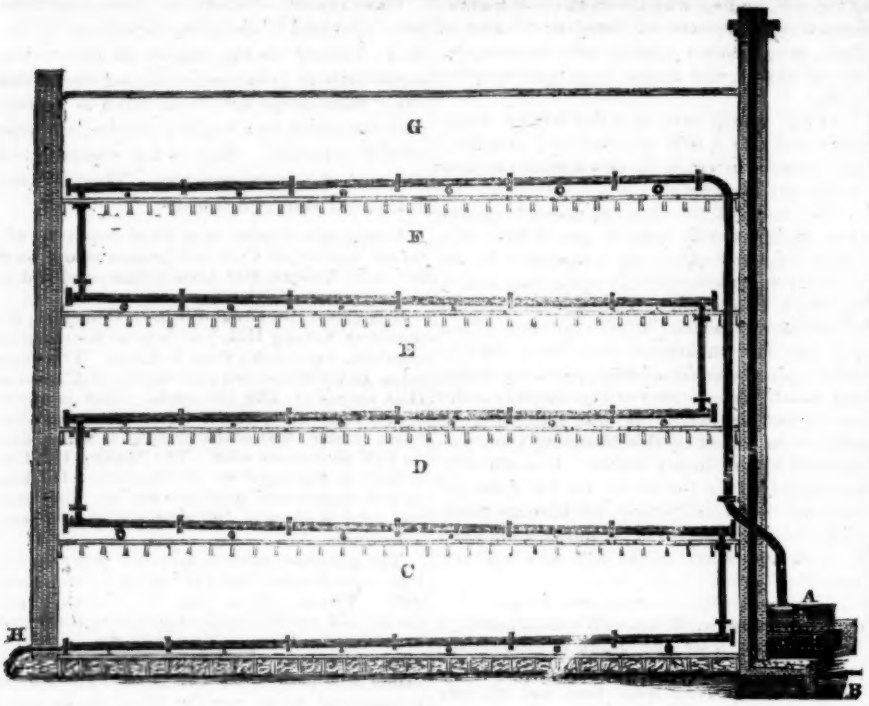
The grounds are open daily for public inspection. As soon as £15,000 are subscribed, the work is to be commenced, so as to complete the whole cemetery this year. The round tower, the ancient temple church, is to be a model for one of the funeral chapels, which are to be erected on the grounds.

The treasurer guarantees the re-payment of the subscriptions, provided a sufficient capital is not raised. Subscribers may transfer their shares and take a piece of freehold land instead, comprising a site capable of containing ten coffins, or five for half a share. Each person employs his own architect, the company not intending to act as undertakers.

This cemetery has an additional interest, from its being designed for those who die out of the pale of the English Church as well as those who die in it. Such is the absurdity of bigotry in established religions, and in laws against sacrilege, &c. that by the laws of England a dissenting clergyman cannot officiate in *consecrated* (that is, Church of England,) burial grounds, nor can an Episcopalian minister officiate in *unconsecrated* grounds. The consequence is, that the bodies of churchmen and dissenters are kept as far apart, after they are dead, as their creeds were while living. This absurdity has not failed to strike some liberal minds in England. In a debate, March 18, 1834, in the British Commons, Lord Althorp said, he wished some other plan than by legislative enactment could be devised, by which the difficulty of non-parochial burial for dissenters could be obviated.

The Notting Hill Cemetery being without the bounds of a parish, it admits of ministers in surplices, and clergymen in plain coats, performing the rites of sepulture, at the same time, for the man who has received the sacrament kneeling in the chapel, and for another who took it seated in his pew.

There must indeed be "many mansions" in Heaven for people who believe as they do in England, that a churchman and a dissenter cannot lie quietly in their graves in the same church-yard!



Effectual Plan of Heating Factories, &c., by Steam. Communicated by the Inventor. To the Editor of the Mechanics' Magazine and Register of Inventions, &c.

[We have much pleasure in inserting the following communication from Mr. Snodgrass, an eminent engineer of Glasgow, N. Britain, now on a visit to the United States for the purpose of ascertaining the state of manufactures and mechanical inventions here. We hope to be favored with other contributions during his tour through various parts of the country, which, we are persuaded, will be highly interesting to our readers.—Ed. M. M.]

Sir,—Having perused your interesting and valuable Magazine, I beg leave to avail myself of the pleasure of contributing in a small degree what appears to me would materially benefit the rising manufactories of this justly far-famed free country, namely, the best plan of heating by steam. Although I am almost a stranger here, I learn there are, and have seen, a number of beautiful factories heated by stoves, while in Great Britain there are none, to my knowledge, otherwise than by steam. It must be evident that this method is incompatible with the American atmosphere, which in particular seasons of the year, I am told, is highly electrical, and destitute of hydrogen. Stove heat must accelerate this evil in a considerable degree, in the apartments of the factories, which are injurious to the staple of the cotton, during the process of roving and spinning, unhealthful to the workers, and a great increase of risk of accident from firing the building.

Having invented and introduced the system of heating by steam pipes, from 1799 to 1807, (see Philosophical Transactions, London, Vol. for March, 1807,) and since then having 27 years' experience, I presume to send you herewith a plain sketch of the simplest and most effectual plan of heating any regular built factory, and with steam of the lowest temperature. References—A, the boiler; B, the ash-hole; C, 1st flat; D, 2d flat; E, 3d flat; F, 4th flat; G, garret flat; H, condensed water pipe.

On looking at the plan from right to left, the pipes are inclined according to the length of the factory, so as the air and condensed water may freely recede before the steam, then descend by the perpendicular pipe to next flat, and so on from flat to flat, after sending the steam to the garret flat in the first instance by a large upright, not less than eight or nine inches in diameter, thus allowing as little condensation as possible taking place in that pipe; it ought to be secured from the external air, and made as a reservoir of steam to the boiler. As each range of pipes descends from the garret flat, they ought to increase in diameter about a half inch in each flat, owing to the latent heat of the steam diminishing as the distance increases from the boiler. The small copper pipe at the end of the cast iron range of pipes in the lowest flat, for the discharge of air and condensed water, may be about three-fourths of an inch in diameter. These pipes should be laid on small rollers, pivots of which to move in a small frame (cast iron) fixed on the floors, and close to the washboard of the apartment, on any side most convenient for passing them, thus, not almost, appearing in the room, and, in the lowest position, more effectually heating the air.

The data for proportioning the diameter of these pipes to the temperature of the air in the apartments is a square foot of surface of steam pipe for 200 cubic feet of air, to produce about 64 degrees of heat, supposing the steam about 4 lbs. on the square inch of pressure above the atmosphere, and the surface of the pipes black,—160 superficial inches steam pipe for 72 degrees of heat.

I may add: the boiler may be so placed that the condensed water may be returned to the bottom, and save in a small degree the latent heat therein. Where steam engines are employed to drive the machinery, the surplus steam for a great part of the year is sufficient to heat the factory, thus saving the whole expense of fuel nearly. Insurance ought not to be more than the half, compared with the risk of stoves. If any further information is found wanting, your taking the trouble of addressing me, care of Messrs. Thomson & MacFarlane, No. 87 Pearl street, will be duly attended to by, Sir, yours, most respectfully, Neil Snodgrass,

Civil Engineer, of Glasgow.

New-York, May 5, 1834.

N. B.—In irregular built factories, much is to be attended to in the arrangement of steam apparatus, for the proper charging with steam, and discharging air and water; also, the best plan for joining the pipes to make them permanent and cheap, which I shall be glad to engineer, and insure the result; also, my metallic packings for steam engine pistons, and piston valves, a drawing and description of which shall be handed you in a short time. N. S.

Valuable Discovery in the Fine Arts.—Mr. Mudie, well known as an able literary compiler, has brought out a popular work on "the feathered tribes of the British Island," in which, amongst other attractive features, the vignettes on the title pages are novelties, being the first successful specimen (says Mr. Mudie) of what may be called Polycromatic printing, or printing in many colors from wooden blocks.

"By this method," he adds, "every shade of color, every breath of tint, every delicacy of hatching, and every degree of evanescence in the outline, can be obtained; and fifty thousand fac similes of a painting may be produced with perfect uniformity and at moderate expense. The advantages to books, of which a large number is to be sold, will be very great, not only as removing the cost of tinging by hand, which is the same for the last thousand as the first, but by making the copies more alike and more durable, and rising more above the reach of the ignoble pecus of imitators. In these vignettes, Mr. Baxter had no colored copy but the birds, which are from nature. I made him work from mere scratches in outline, in order to test his metal; and I feel confident that the public will agree with me in thinking it sterling. In carrying this very beautiful branch of the typographical art successfully into effect, Mr. B. has, I believe, completed what was the last project of the great Bewick, but which that truly original and admirable genius did not live to accomplish."

Illuminated Printing.—In many of the old printed books, the initial letters, and occasionally other parts, were printed in red. This was done by two workings at press, and was an imitation of the earlier fashion of *illuminating* manuscripts. The practice is still followed in some almanacs, the saints' days and holy-days being "red-letter days." Some ingenious contrivances have been devised for working in various colors; and a few years since, a curious book was written and published on the subject by Mr. Savage. Still more recently, printing in gold and other metals has been practised. This is done by printing with a sort of size, and afterwards applying the metal leaf. Some very handsome specimens of this have been produced by Messrs. Howlett and Brimmer, of London; but, of course, the process is too costly and too tedious ever to enter into competition with common printing, or to be used for other than purposes of luxury.

Effect of Oil on Water.—The following is a secret worth knowing: In rough weather they (the fishermen of the Bosphorus) spread a few drops of oil on the surface, which permits them to see clearly to a great depth. I was aware that oil would calm the surface of the sea; but until recently I did not know that it rendered objects more distinct beneath the surface. A trinket of some value had been dropped out of one of the upper windows of our palace

into the Bosphorus, which at this place was 10 or 12 feet deep. It was so small that dragging for it would have been perfectly useless, and it was accordingly given up for lost, when one of the servants proposed to drop a little oil on the surface. This was acceded to, with, however, but faint hopes of success. To our astonishment, the trinket immediately appeared in sight, and was eventually recovered.—[Dr. Dekay.]

Inquiries respecting the Weight of Man at different Ages. By M. QUETELET.

The Statistical Researches of M. Quetelet are well known to the public. They possess the rare merit of at once being very exact and well arranged, even in the most minute details, and in investigating certain very important scientific and philosophic questions. Accordingly, in estimating, with more precision than had been done, the weight and the average stature of the male and the female, at different ages, (or different periods of life,) and among different nations, M. Quetelet, as well as M. Villermé and other *savans*, have not been desirous to satisfy a vain and trifling curiosity; they have deduced principles relating to the health of man in different circumstances, to Hygiene, to the laws of conscription, and even to the fine arts. Under the last relation, which appears a little foreign, this is the manner in which M. Quetelet expresses himself in the preamble of the work of which we speak.

"In order to produce a work which may be truly capable of touching us, and of affecting our passions, we must know man, and above all, the man whom we would represent. To take a single example, the artist, who has studied only the type of the Greek physiognomies, however admirable in other respects this type may appear to us, if he reproduces it in modern subjects, it will be cold and ineffectual upon the spectator, who will perhaps admire the art and composition, but will not be deeply affected. The Greek figures—however varied they may be, on account of age, passion, and sex—have, notwithstanding, an air of family, which carries us back towards antiquity, in spite of ourselves, and withdraws our attention from the subject which we would represent.

"If one endeavors to make them, the anachronism will become more sensible. Artists at the commencement have comprehended this necessity of painting what they had under their eyes, and it is in this way that they have produced effects so magical. The noble and severe figure of Christ has nothing in common with that of Apollo nor of Jupiter of the ancient mythology. A Virgin Mary of Raphael has an enchanting grace, which yields to nothing in the most beautiful ancient forms, and they exert on the imagination a greater influence, because they are more conformable to nature by which we are surrounded, and because they act more immediately upon us. We ourselves, in climates more remote, perceive the need, in retracing our national actions, not to present Greek or Italian figures in the midst of a battle, in which we find men, almost all of the same age, all alike covered with warlike apparel: our eye seeks to recognize, from the features and expressions of the physiognomies, the Frenchman or the Englishman, the German or the Russian. Even in the French army, the soldier of the Old Guard had a physiognomy which had become classic, and which was identified in some measure with the remembrances of the empire.

"It is certainly to the little attention that has been given to the study of the shades, by which the physical and moral qualities of man pass among different nations and in different ages, which gives rise to that monotony and coldness of the greater part of the works of the imagination. We have, indeed, perceived the necessity of studying nature, and of being true; but, I think we have not remarked sufficiently that nature is not invariable. The ancients have represented, with infinite skill, physical and moral man, such as he existed then; and the greater number of the moderns, struck with the perfection of their works, have believed that they can do nothing better than servilely imitate them; and they have not considered that the type had changed, and that, in imitating for the perfection of the art, they had another nature to study. Hence this universal cry, 'Who will deliver us from the Greeks and Romans?' hence this violent schism between the classics and the *romantique;* hence, in fine, the need of a literature which would truly be the *expression of society.* This great revolution is accomplished, and it furnishes a proof the most unexceptionable of the variability of the human type, of *l'homme moyen,* among different nations and different ages.

"Thus the determination of average man is not useless, even for the fine arts and letters, and he who would arrive at this determination will have no difficulty to make artists and literati listen to him. He would teach them to know, in a more precise manner, things which they already know vaguely: he would teach them other things of which they are ignorant, or at least he would rectify their judgment concerning a multitude of prejudices. They would receive these in the same manner as a painter learns perspective, which, under its geometrical form, is far from being picturesque also. Moreover, they have received the researches of Gall and Lavater with more eagerness, perhaps, than the savans themselves; it is even to their care that we owe, in a great measure, the knowledge of the proportions of the different parts of the human body as respects age and sex."

In the little work in which we find these general considerations, with others which we are compelled to omit, the author investigates what concerns the developement of the weight of man in the same manner as he has determined his growth, his inclination to crime, the succession of generations, &c. Afterwards he will publish new inquiries concerning the strength, swiftness, and other qualities of the human species; inquiries which, in order to be exact, must be made by many associated observers, and upon a great number of individuals. Physicians and engineers have been sometimes led to estimate the weight of men arrived at maturity, and considered, for example, as burdens placed upon a building, or as weights acting on a machine. La Hire has made very remarkable researches of this nature. On the other hand, the legal practitioner must often be occupied with this subject, for one of the most frequent problems is to determine after death the probable age of an individual, from the assemblage of physical qualities. On this grave question, we are generally reduced to the estimation of practitioners more or less vague; but if, in a case of infanticide, for example, we stated in the proces-verbal the weight and stature of the infant, as well as those physical characters susceptible of measure, and as we might have, by the side of that, well constructed tables, which would give us for the different ages the values of these physical qualities and their mean variations, we would have terms of comparison which would be better than the appreciation of practitioners, or which would serve at least to control their assertions. We see from these examples, that the inquiries concerning the weight of man have more than one application.

The observations of M. Quetelet were made at Brussels in the Maternal Hospice of St. Peter; he compares them with those made at Moscow and Paris, in similar hospices; and he finds little difference between the means obtained. Unfortunately the Russian and French practitioners have not distinguished, with as much care as M. Quetelet, the sex, the stature, and the weight of children observed at their birth. This renders the results less capable of comparison. M. Quetelet found for sixty-three male children, and fifty-six female, newly born, the following quantities,

	Weights.	*Stature.*
Male children	7.057536 lb. Avoird.	1.62732 feet.
Female do.	6.4179468	1.58467

The extremes are—

	Boys.	*Girls.*
Mimmum,	5.1608232 lb. Avoird.	2.4701376 lb. Av.
Maximum,	9.92466	9.36329

The mean weight, without distinction of sex, is 6.7377414 lb. Avoird. It has been found at Paris on 20,000 observations, 6.74656332 lb. Avoird.

M. Quetelet has made similar inquiries concerning children from four to twelve years of age, in the schools of Brussels, and in the orphan hospital—concerning young people in the colleges and in the medical school—finally, concerning old men in the magnificent hospice which has been constructed in the same city for a period of four years. The results have been completed by observations made upon isolated individuals, taken by chance from the mean of all these data. The author has been able to construct tables, which shows the mean stature, the mean weight, as well as the minimum and miximum, at each age, and for both sexes. These tables show that there exists at each age, and for each sex, a constant relation between the mean weight and the mean stature, from which the author has constructed another table, more exact than those which result directly from observations on the weights. It follows, from the mean stature formerly observed by the author, for the whole population, or at least from a number of individuals much more considerable than in these last inquiries, and gives the mean weight corresponding to each stature, according to the observations which make the subject of this memoir.*

The following is a table, which we may consider as exact for the whole population of Brussels, and which, for want of a table of this sort, calculated for other countries, may serve, at least, as an approximation for the Caucasian race, and in a temperate climate.

A TABLE of the Development of the Stature and Weight.

	Males.		Females.	
	Stature.	*Weight.*	*Stature.*	*Weight.*
Years.	Imp. Ft.	lb. Avoir.	Imp. Ft.	lb. Avoir.
0	1 64045	7.65736	1.60764	6.4179468
1	2.29007	20.841786	2.26382	19.3861692
2	2.59519	25.0101432	2.56238	23.5324716
3	2 83469	27.5023356	2.79532	26.0026092
4	3 04468	31.3839804	3.00102	28.67124
5	3.24153	34.7804194	3.19539	31.6706928
6	3.43511	38.7982752	3.38261	35.28768
7	3 62539	42.981168	3 56305	38 6841192
8	3 81240	45 7857648	3.74351	42 0805584
9	3.39942	49 951122	3.92067	47.1049538
10	4.18314	54.0783696	4.09457	51.8728890
11	4.3636	59.768508	4.26189	56.570562
12	4.54404	65.7674136	4 43905	65.7674136
13	4.72122	75.8244024	4.60310	72.6485112
14	4.89838	85.4844048	4.76714	80.941116
15	5.07227	88.69745824	4.91807	89,035276
16	5 23575	109.5461916	5.03618	96.0927636
17	5.36099	116 559618	5 10179	104.3412588
18	5.43973	127.587013	5.13132	112.5456444
19	5 49322	132.4611288	5.15757	115.3024946
25	5.51191	138.7909564	5.17398	117.5079744
30	5.52503	140 378802	5.18054	119.8237284
40	5.52503	140.4229116	5.18054	121.8686604
50	5 49322	139.9597608	5.03946	123.8697568
60	5.37740	136.074312	4.97384	119.757564
70	5.32490	131.2701696	4.96728	113.6042748
80	5 29219	127.5429084	4.84103	108.884576
90	5 29219	127.5429084	4.93775	108.8183832

We see, from this table, 1st. That, at an equality of age, the male is generally heavier than the female; towards the age of twelve years only, an individual of either sex has the same weight. 2dly. That the male attains the maximum weight about the age of forty years, and that he begins to lose, in a very sensible manner, towards his sixtieth year; that, at the age of eighty years, he has lost about 13.23288 lb. Avoird., the stature being also diminished 2.75604 inches. 3dly. That the female attains the maximum weight later than the male, towards the fiftieth year. 4thly. That when the male and the female have assumed their complete development, they weigh almost exactly twenty times as much as at the moment of their birth, while their stature is only about 3 1-4 times beyond what it was at the same period.

Children lose weight during the three first days after their birth; at the age of a week they begin sensibly to increase; after one year they have tripled their weight; then they require six years to double the weight of one year, then thirteen to quadruple it.

To calculate the burden of an edifice, or a bridge covered with a crowd, it is well to know that the mean weight of an individual, whatever is the age or sex, is about 98.584956 lb., that is, 103.65756 lb. Avoird. for the males, and 93.7328 lb. Avoird. for the females.

During the development of individuals of both sexes, we may regard the squares of the numbers representing the weights, at the different ages, as proportional to the fifth powers of the statures. After the complete development of individuals of both sexes, the weights are almost the squares of the statures.

The weights have varied, in the extremes, among individuals regularly conformed, from 1 to 2, whilst the stature has varied only from 1 to 1 1 3.

The inferior parts of the body are developed more than the superior. In a child, the head is equal to a fifth part; and in a full grown man, to an eighth of the whole height of the individual. It appears from a note at the end, that these proportions, vary a little among different nations; but M. Quetelet, who, in his preliminary observations, explains very well the importance of these inquiries to the fine arts, does not appear to have written this work purposely for them. The activity which he has exhibited in his researches, makes us believe and hope that he will resume them at another time.

This little interesting work is terminated by data concerning the weight of human bones, which belonged to individuals of different ages, a very important subject in certain cases of legal medicine.

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*The author cannot consider the results obtained in hospitals and public schools as very exact as to the mean stature of the population, because inquiries made by him concerning a great number of individuals have proved to him that the mean stature is a little more among individuals in easy circumstances than in the indigent population, who have recourse to hospices, hospitals, and gratuitous schools.

[We abridge the following from the Transactions of the Highland Society of Scotland. It is very probable that the tobacco wash, recommended at page 163, N. Y. F., if applied several times, would be of great service to sheep.]

Essay on the Sheep Maggot and Fly, with Observations relative to the other kinds of Vermin to which Sheep are liable. By Mr. G. MATHER, Shepherd, New Seone, Perth.

The sheep maggot fly generally commences its operations in May, commonly making its attack about the onset of the tail, or between the buttocks. The latter case only happens, however, when the excrements are allowed to remain hanging in the wool till putrefaction takes place. As the season advances, the fly continues to deposit its eggs in various parts of the fleece, especially on sheep of the long-wooled kind. In June, the sheep being newly shorn, they are seldom troubled with maggots; but lambs are subject to them, although, if the excrement is removed, the insects seldom do them much injury. In July the wool has attained some length, and begins to retain the perspired matters which support the maggots; and in August, as it is still advancing in growth, more damage may be apprehended. The danger increases till the middle of September, and in some seasons maggots have been seen on sheep in October, although at that period they never perforate the skin.

All sheep that have long coats, particularly those of the Leicester breed, are more subject to maggots along their back than those which have shorter and finer wool. Sometimes old rams, in damp hot weather, get maggots about the roots of the horns, especially those of the Spanish and Dorset breeds. All fine-wooled sheep, as well as others, when affected with diarrhœa or dysentery, are subject to maggots about the root of the tail, and between the buttocks.

When their bowels become thus diseased in the warm season, the tail and neighboring parts should be neatly shorn as close to the skin as possible, after which the maggot-liquid should be applied round the rump and between the buttocks.

Indications of the Sheep-Maggot and Fly.—The rapid increase of these insects of late years is obvious. The sense of smell in the fly seems to be very acute, as nothing putrid escapes their detection, in whatever situation it may occur. These active insects are so anxious to deposit their eggs in a place of safety, and where animation is sure to take place, that they will venture into the deepest crevice and search out the most secret places, where their brood may be secure. They are generally to be found in the greatest abundance in the vicinity of gentlemen's habitations, particularly where dogs are kept. This is caused by preserving carrion in such a manner as to expose it freely, as by hanging it on trees, a practice which must have added greatly to the increase of flies.

All maggots that fall to the ground uninjured immediately conceal themselves in the earth, till the return of another season, when they come from their hiding-places, metamorphosed into winged insects.

Progress of the Maggot.—In the case of diarrhœa or dysentery, in the hot season, if the animal is not attended to, a bloody slime, having a nauseous smell, is often voided along with the excrement; the pain in the bowels, and the itching at the anus, cause it to rub its tail from side to side, thus mixing the offensive excrement with the wool on the buttocks. A sheep thus diseased is immediately attacked by the fly, which deposits its eggs in great numbers. The maggot, as soon as it has received life, keeps gnawing at the skin; inflammation takes place, and there issues a fluid of a disagreeable smell, which feeds the young maggots, and prepares the wool for the reception of eggs. In the course of two or three days there may be on the animal many thousands of maggots, which are incessantly occupied in perforating the skin. The tormented creature leaves its associates, and generally retires to some hollow place, where it lies panting under a hot sun; being thus more conveniently situated for its assassins, who, by the after part of the day, make large incursions into the flesh, and before morning reduce it to a lifeless mass, covered with loathsome vermin.

Consequences of the Attack of the Maggot Fly.—When sheep are attacked by the fly, and the eggs are developed, death inevitably follows, unless the maggots are destroyed; but if attention be paid in time, and the affected parts be profusely wetted with the liquid, it will destroy the worms, if they have not been alive for more than ten hours. If the maggots have got strong, and have begun to perforate the skin, they then get in clusters on the parts that are injured. When this happens, more pains must be taken, every sore place must be properly looked for, and the clusters of vermin carefully taken out of the wool with the hand and destroyed. Then let the whole of the fleece be profusely wetted with the liquid, which will destroy the vermin that may remain; and if the fly should again deposit her eggs, they will not be developed.

When the flies get in motion, if the sores are on the fore-quarters, the animal uses the hind foot, or if on the hind-quarters, it employs its mouth, to destroy its enemies; but the more efforts it makes, the more it aggravates the injury. It continues thus day after day, and although the parts may be dressed, the sores continue, so that the skin bears the marks of the disease at the next shearing time; and when it has been severely mangled, it never again bears wool, and the cicatrices of the sores remaining tender, the small flies attack them, so that the creature is tormented every hot season as long as it lives.

On destroying Maggots.—When dog-keepers wish to preserve carrion, they ought to hang it under a covered shed upon a beam, with an oblong box below, three feet deep, and three inches wider at the bottom than at the top, with the boards cleaned in the inside. The maggots will thus be prevented from crawling out, and a little quicklime at the bottom will insure their destruction. All useless carrion, dead vermin, &c. ought to be put under ground, before the fly deposits its eggs, even within the nostrils of vermin, or in any crevice of the carrion.

Maggots may be prevented from breeding on sheep by applying the following mixture:

Take 1 lb. of arsenic, finely pounded,
12 oz. of potash,
6 oz. of common yellow soap,
30 gallons of rain or river water.

Boil the ingredients together for 15 minutes, taking care to breathe as little as possible in the steam.

This liquid is in no degree injurious to wool. It cleans and dries the offensive perspiration of the sheep, and destroys the smell caused by the dew in the mornings, or by damp hot weather. In most seasons and situations, one dressing in July and another in August will suffice; but as the expense is trifling, and the process simple, it may be better to apply it more frequently, especially in low and damp situations.

To dress the lamb flock in June is of very considerable importance, as it answers two purposes,—destroying the ticks, and preserving the animal from the attack of the maggot-fly for a considerable time.

Times for dressing with the Maggot Liquid.—If the situation be low, and three dressings be intended, the 30th of June, the 28th of July, and the 25th of August, will answer. If the situation be higher, and only two dressings be intended, let them take place on the 10th of July, and the 20th of August. It is not likely that the days specified will always answer, as the state of the weather must be attended to, and, in some seasons, it may be necessary to dress a few days earlier.

To preserve Sheep from Maggots in the hot months. May.—The maggot-fly seldom attacks sheep in this month, unless about the onset of the tail, or between the buttocks. This happens only when the excrements are allowed to remain hanging in the wool till they grow putrid.

The cleaning of sheep at this season is of the utmost importance. It eases the yearlings of a considerable burden, and more particularly the ewes that are suckling their lambs; for when they are foul for some days, their udders are liable to become sore, and the lambs put from sucking ever after, which prevents them from thriving.

June.—All sheep in low situations ought to be shorn the first week of this month. At this time all the ticks leave the old sheep, and take shelter in the lamb flock; for this reason, as soon as the mothers are shorn, all the lambs should be completely wetted with the liquid, which will not only destroy the ticks, but prevent the attack of the fry till the middle of July.

July.—In the first week of this month, let all the lambs' tails, and the parts between their buttocks, be neatly shorn, as bare and as smooth as possible. The coats of the old sheep now get some length, and begin to retain the perspiration that nourishes the maggots. If the weather should be damp and hot, the flies will commence their operations on the fleece. It will therefore be advisable to dress the flock with the maggot liquor. Dry weather must always be chosen for this work, for if they should be exposed to rain immediately after the operation, the solution would be washed off.

All that is necessary to be done is to have a tin vessel, with a mouth like that of a tea-pot, so as to discharge the liquid regularly, the only difference between it and that of the tea-pot being that it is open from end to end. Place the liquor-tub by the side of the pen, in the most convenient place for dipping the supplying vessel in.

The small pens being filled, as mentioned above, the liquor must be poured right on the centre of the sheep's back, from the neck to the rump, particular attention being paid to the onset of the tail.

August.—In this month maggots are generally most troublesome. It will be necessary to repeat the dressing, keeping as near the specified times as possible.

September.—In the beginning of this month some maggots may still be expected, but towards the middle of it they become less troublesome.

On the Small Fly.—The small flies are, in low situations, much more troublesome to sheep than the large maggot-flies, although not so dangerous. If they find the least sore, they are upon it immediately · and by their constant gnawing they soon enlarge it, and inflict considerable pain on the animal. If any place is not sufficiently covered with wool, they readily make their way to it, and they even eat the roots of the horns to the quick. In this manner they are often productive of great torment, and their persecutions do not cease until the beginning of the cold season.

The liquid already mentioned, the soap being omitted, and a little coarse sugar added, readily destroys them, as they are very fond of it, and will sip it until they fall dead. Swallows, spiders, wasps, and other animals, are their natural enemies; and when they swarm in cottages and houses, they may easily be destroyed with some care, especially with the aid of the arsenical liquid; and although they cannot be entirely extirpated, it is obvious that, by proper arrangements as to cleanliness, they might be kept down in a great degree.

Report on the Cultivation of Turnips with Compost applied in a peculiar manner. By Mr. HUGH MUNRO, Assynt by Evanton, Ross-shire.

[The following is from the Transactions of the Highland Society of Scotland, and the plan may be worthy of imitation in some instances.]

I had a field of nine acres, which I wished re-

turned into grass, and from the little experience I have as a farmer of four years' standing, I considered that grass after turnip eaten off by sheep would be better than after any other course. I at one time thought I should be obliged to purchase bone-manure for this field, not having any fold manure; but the expense of bones for nine acres, at twenty-five bushels per acre, at 2s. 10d. (the price last season), would £3 10s. 10d., or £31 17s. 6d. I have, however, heard that fourteen bushels of bones per acre have been applied to raise turnip with success, which makes £1 19s. 8d. per acre, or £17 17s. for nine acres. So I determined to try and find a substitute that would be cheaper and equally effective, in which, I am happy to say, I have succeeded beyond my most sanguine expectations. I got some of the small tenantry to bring to me a quantity of peat-moss, for which I paid £2 10s. I then mixed all the chaff from the mill, the fire-ashes from my own house, together with the sweepings and fire ashes, &c. &c. of my servants' houses, (for which I gave straw to bed their pigs,) the scrapings of roads and ditches, and then wetted the whole with the superfluous urine from the fold, having added a little lime and horse dung, and turned it frequently till it was well pulverised; and in this way I prepared 45 single cart loads. During the winter, I drilled from the stubble the field intended for turnip, and let it lie exposed to the weather in that state until the end of May, when I harrowed it smooth, and then drilled it again by splitting the former drills. I then put a light roller over the drills to make it smooth, and commenced laying down the turnip in the following manner. I had five men with large dibbles made of hard wood, with which they made holes eight inches apart on the top of the drills, pressing down the dibble with the foot, each man having a single drill, followed by a woman with a basketful of the prepared manure,* and into each hole made by the dibble she placed a handful of manure. After her, followed a girl with a little bag of turnip seed†, putting from three to six or more grains on the top of the manure, with her fore finger and thumb, drawing a little earth over it; and in this manner I carried on five drills at a time with fifteen people, viz. a man and two women to each drill. The whole went on like clock-work, and I finished the nine acres in four days, at an expense of about £5, including purchase of peat moss. The turnips grew rapidly, and I had them cleaned in the usual manner, sometimes leaving two plants in one hole, which I found to answer well, especially if the plants happened to be a little distant from each other, say about two inches. I have thus raised an excellent crop of large turnip, by applying *only* five single cart-loads per acre of this prepared manure, and the expense of the whole does not exceed £5; indeed, they are so good, that I am now stripping one half previous to putting on the sheep. Every one who has seen the turnip has been surprised, and several in my neighborhood intend adopting the same plan next year. I shall now attempt to make some observations on this plan which I have adopted.

1st. Where the land is foul with weeds, the usual mode of cleaning should be adopted, and then drilling the land once.

2d. That the manure to be prepared should be made as strong as possible, by the superfluous urine of the court-yard in winter; and that the scrapings of roads and ditches, with rubbish of old houses, &c., would be preferable to peat-moss. A boll of lime should also be mixed with every ten cart-loads, and, when well attended to, less than five cart-loads per acre will be found sufficient.

3d. I observe that, although the season may be dry, and the sides of the hole liable to fall in, yet, by making the women with the manure follow the dibble quickly, this inconvenience (and I may say it is the only one) will be obviated in a great measure; and where this was done, I found no difference in the crop of turnips.

4th. This plan can be followed in all kinds of weather, and *better while raining*, which is not the case in the usual method.

5th. Where five or more grains of the seed come up together, (forced on by the strength of the manure over which the seed is immediately placed,) they will force themselves through, even should the soil be barkened by rain, wind, and sunshine. And,

6th. Should dry weather be the character of the season while sowing the turnips, they will show a healthy braird, the manure, which is their food, being close at hand, and they not being obliged to push their delicate roots through a quantity of earth in search of nourishment, as in the method now in use.

* The manure is taken to the field in carts from where it is made, and the driver fills each woman's basket as they may require it.

† I only expended 2 lb. of turnip seed for each acre.

Culture of the Potato Onion.—Fresh manure is highly injurious to every kind of bulbous root: a sandy soil, with a well drained bottom, is the best; but any good ground will answer that is free from springs near the surface. The ground should be dug and well broken to the depth of two feet, if possible, and a compost spread four inches deep on the surface, composed of the following materials:

Well rotted cow-dung, one-fifth, or equal parts.

Grey sand—if shelly, so much the better—one-fifth, or equal parts;

Turf mould, one-fifth, do.;

Good sound fresh earth, one-fifth, do.;

Coal ashes, one-fifth, do.;

The bulbs should be laid in rows fourteen to sixteen inches apart, and six or seven inches from one to another in the row; they should be barely covered with the hoe in the first instance, as they must have time to strike and swell before they are incumbered with a weight of earth. Plant the bulbs in September, October, November, and December, and cover them gradually until a mound is raised about six inches high, and four or five inches broad at the base, according to the size. In the month of May, or perhaps in April, the onions may be again uncovered and exposed to the sun, and remain uncovered until they are ripe. This practice accelerates their arrival at maturity, and greatly diminishes the trouble in saving them. In taking up the onions, great care is required not to separate the small bulbs which grow in clusters on the tops of the large ones; these might be removed a few weeks before you dig out the large bulbs. They should be planted again in masses, taking care to remove any of them that may have become soft or decayed; in this way they nourish and assist each other; but if by any accident the clusters should be broken, they may be planted separately.—[Irish Farmer's and Gardener's Magazine.]

Culture of the Mushroom.—Towards the middle of October I empty the melon pits of the old dung, tan, or tree leaves, reserving any that appears fresh, which I mix with fresh stable dung, and return to the pits, first placing a layer of entirely fresh dung at the bottom. I tread firmly as I proceed. When the pit is quite filled, I put on the sashes, tilting them to permit the escape of steam. In a fortnight or three weeks, the dung will have subsided, and the heat will be sufficiently abated. I then place a layer of a few inches thick of horse-droppings, from a stable where the horses are fed on hay and oats only, and which droppings must be well dried previously to being used: this layer is to be tramped, and the spawn, in lumps about the size of a goose-egg, is to be placed one lump in each area of six inches, and covered with three inches fresh loam from a pasture, and beaten down well with the back of the spade. Dry hay is to be placed upon the surface of the bed, and air admitted in fine weather. The layer of droppings soon becomes a continuous mass of spawn; and the quantity of mushrooms produced throughout the winter and spring is truly astonishing. Water will be required occasionally, particularly as the days begin to get warm in spring. Towards the beginning of May, when the pits are required for other purposes, abundant spawn may be preserved for future operation.—[Irish Farmer's and Gardener's Magazine.]

Cultivation of the Dandelion.—The following is from the New-England Farmer:

We doubt whether any vegetable is more improved by culture than the common dandelion, *leontodon taraxacum*. We believe that Gen. H. A. S. Dearborn is the first person who, in this country, attempted to raise this vegetable in a garden, by planting it in rows, and subjecting it to the same treatment which is afforded to hoed crops. Notice of his experiment, and its successful result, was published in the New-England Farmer, vol. vi., page 337, May 16, 1828.

Since that period we have heard of several persons having been successful in the garden culture of the dandelion. But we believe that the following may be considered as the *cap sheaf* of all experiments in attempting to domesticate this valuable vegetable. Mr. G. Pierce, of Charlestown, raised this spring a dandelion which measured 6 feet in circumference, and weighed 4 lbs. 3 oz. The whole mass of foliage sprang from a single root, and had been only twenty days in growing! It was exhibited at No. 27 North Market street, to a great many admiring spectators, and we were among the number. The leaves were small and tender, but innumerable, and matted together like the fibres of wool in a carpet. The dandelion is not only a palatable pot herb, but may be blanched like celery, and makes an excellent salad, and is esteemed very wholesome, if eaten in any way.

Naturalization of Fishes.—At a late meeting of the Zoological Society, were read two letter from Mr. J. B. Arnold of Guernsey, detailing his experiments in the naturalization of sea fishes in a lake chiefly supplied with fresh water. The area of the lake is about five acres; its depth various; and its bottom also various, being muddy, gravelly, and rocky. The water is, during nine months of the year, drinkable for cattle, but in consequence of a supply which it receives through a tunnel communicating with the sea, is rather salt in summer, at which season the fishes do not come down so plentifully as at other times. The fishes introduced into the lake have been the grey mullet, sole, turbot, brill, plaice, basse, smelt, and grey loach. All of these have thriven well, and are believed to have increased in numbers; the grey mullet especially is known to have bred as freely as in the sea itself. A single whiting having been caught for three successive years, was found to have grown considerably; a pilchard also throve well. All the above-mentioned fishes were placed in the lake, except perhaps the brill; but others, as the silver bream, appear to have introduced themselves. It is even suspected that hybrid fishes have been produced, as several have been caught which were unknown to persons well acquainted with the species usually met with on the coast of Guernsey. Mr. Arnold adds that sea fishes, after having been naturalized in his lake, have been transferred to ponds of spring water, where they have not only lived, but done well; and that such naturalized fishes have been carried to a long distance, being much more tenacious of life than those caught in the sea.—[Proc. Zool. Society.]

One Animal preys on another.—A large hake was lately taken on the coast of England in which was found a clever sized codling. On opening the codling a small ling was found, sepulchred in his maw. On opening the ling, an angle worm and several marine insects were found established in close quarters.

OF ECLIPSES.—Of all the various phenomena of the heavens, there are none which have created so much curiosity, excited so much interest, or caused so great terror, throughout the world, as eclipses of the sun and moon; and to those who are unacquainted with the principles of astronomy, there is nothing, perhaps, which appears more extraordinary than the accuracy with which they can be predicted.

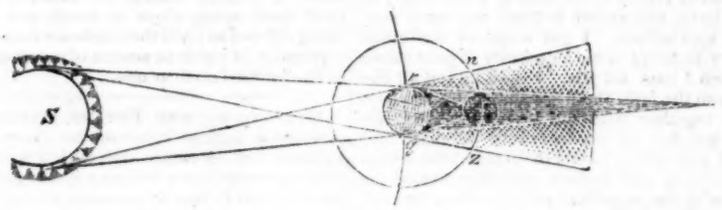
In the earlier ages of the world, before science had enlightened the minds of men, appearances of this kind were generally regarded as alarming deviations from the established laws of nature; and but few, even among philosophers themselves, were able to account for these extraordinary appearances. At length, when men began to apply themselves to observations, and when the motions of the celestial bodies were better understood, these phenomena were not only found to depend upon a regular cause, but to admit of a natural and easy solution. There are, however, nations that still entertain the most superstitious notions respecting eclipses, particularly the Mexicans and Chinese.

> Thus when the infant moon her circling sphere
> Wheels o'er the sun's broad disk, her shadow falls
> On earth's fair bosom; darkness chills the fields,
> And dreary night invests the face of heaven.
> Reflected from the lake, full many a star
> Glimmers with feeble languor. India's sons,
> Affrighted, in wild tumult rend the air.
> Before his idol god, with barb'rous shriek,
> The Brachman* falls: when soon the eye of day
> Darts his all-cheering radiance, from the gloom
> Emerging. Joy invades the wond'ring crowd,
> And acclamation rushes from the tongues
> Of thousands, that around their blazing pile
> Riot in antic dance and dissonant song.—[Zouch.]

Many instances are to be found, not only in ancient, but even in comparatively modern history, where the superstition of the times has continued to connect the records of eclipses with the details of some remarkable event, which either happens soon after or during their continuance. But these details being foreign to the nature of the present work, we shall proceed to give an account of the causes, and various kinds of eclipses of the sun and moon.

As every planet belonging to the solar system, both primary and secondary, derives its light from the sun, it must cast a shadow towards that part of the heavens which is opposite to the sun. This shadow is, of course, nothing but a privation of light in the space hid from the sun by the opaque body, and will always be proportionate to the relative magnitudes of the sun and planet. If the sun and planet were both of the same size, the form of the shadow cast by the planet would be that of a cylinder, the diameter of which would be the same as that of the sun or planet, and it would never converge to a point. If the planet were larger than the sun, the shadow would continue to spread or diverge; but as the sun is much larger than the greatest of the planets, the shadows cast by any one of these bodies must converge to a point, the distance of which from the planet will be proportionate to the size and distance of the planet from the sun. The magnitude of the sun is such that the shadow cast by each of the primary planets always converges to a point before it reaches any other planet, so that not one of the primary planets can eclipse another. The shadow of any planet which is accompanied by satellites may on certain occasions eclipse these satellites; but it is not long enough to eclipse any other body. The shadow of a satellite or moon may also, on certain occasions, fall on the primary and eclipse it.

Eclipses of the sun and moon happen when the moon is near her nodes, that is, when she is either in the plane of the ecliptic or very near it. Those of the sun happen only at new moon, or when the moon is in conjunction with the sun; whilst those of the moon happen at the time of *full moon*, or when the moon is in opposition to the sun. The sun, earth, and moon, must, therefore, always be nearly in the same straight line at the time of an eclipse; and conversely, when these three bodies are nearly in a straight line, an eclipse must take place. Hence it is evident, that an eclipse happens in consequence of one of the two opaque bodies, the earth and the moon, being so placed as to prevent the sun's light from falling on the other. See the following figure, which represents the moon passing through the dark shadow of the earth, as she moves in her orbit, *n z*, while the earth moves in the ecliptic, *r q*.



The interposition of the moon between the sun and the earth produces an eclipse of the sun; and the interposition of the earth between the moon and the sun, so that its shadow falls on the moon, produces an eclipse of the moon. On these principles the whole phenomena of eclipses depend, and admit of complete explanation.

If the moon's orbit were coincident with the plane of the ecliptic, the moon's shadow would fall upon the earth, and occasion a *central eclipse* of the sun at every conjunction, or new moon; whilst the earth's shadow would fall on the moon, and occasion a total eclipse of that body at every opposition, or full moon. For as the moon would then always move in the ecliptic, the centres of the sun, earth, and moon, would all be in the same straight line at both of these times. But the moon's orbit is inclined to the ecliptic, and forms with it an angle of about 5° 10′; and therefore the moon is never in the ecliptic, except when she is in one of her *nodes:* hence there may be a considerable number of conjunctions and oppositions of the sun and moon without any eclipse taking place.

The moon is always at some distance from the ecliptic, except when she is in one of her *nodes;* and this distance is called her *latitude*, which is north or south, according as the moon is on the north or south side of the ecliptic. Now, if the moon has any latitude, there cannot be a *central* eclipse, for this can only happen when the moon is in one of her nodes at the moment of conjunction, which is very seldom the case; and, of course, very few central eclipses of the sun have taken place since the creation of the world.* But the section of the earth's shadow (through which the moon passes when she is eclipsed) being much larger than the disc of the moon, the moon may be *totally* eclipsed, although she be at some distance from her node at the time of opposition; but its duration will be the greater the nearer she is to the node. An eclipse of the *sun* may also happen, although the moon be at some distance from her node at the time of conjunction; but its form, as well as its duration, depend very much upon that distance. This circumstance has occasioned the division of eclipses into central, total, annular, and partial.

As the meaning of these terms must be obvious to the reader, it is almost unnecessary to give an explanation of them.

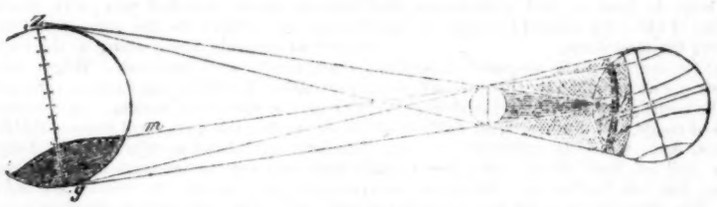
A central eclipse is that in which the centre of the shadow falls on the centre of the body which is eclipsed.

A total eclipse is the obscuration of the whole body eclipsed.

An annular eclipse is that in which the whole of the body eclipsed is hid, except a ring round its edge, which remains luminous.

A partial eclipse is that in which part of the eclipsed body is hid from view.

The following figure represents a partial eclipse of the sun, which will be visible to that tract of the earth marked *n p o*, the line *m n* marks the greatest obscuration.



If the distance be very small, the eclipse will be the greater and continue the longer; but no eclipse of the sun can be either *central* or total, except the moon be in the very node at the time of conjunction. But should she be in this situation, when she is at her least distance from the earth, and the earth at the same time at its least distance from the sun, then the eclipse will not only be central, but *total*, and continue so for a few minutes. But if the moon happens to be at her greatest distance from the earth, and the earth at its greatest distance from the sun,

* Although the Chinese perform the most ridiculous and superstitious ceremonies during the time of an eclipse, yet they can calculate them with the greatest precision.

* One of the most remarkable eclipses of this kind which has ever happened was visible in Britain and several other countries, on the 7th of September, 1820.

the eclipse will be annular, or a small space round the sun's centre only will be hid from view, and a bright lucid ring round his edge will remain visible.

If the moon be less than 17½ degrees from either node at the time of conjunction, her shadow will fall more or less upon the earth, according as she is more or less within this limit; and, of course, the sun will suffer a partial eclipse. And if she be less than 12¼ degrees from either node at the time of opposition, she will pass through more or less of the earth's shadow, according as she is more or less within these lines, and of course she will suffer an eclipse.

As these limits form but a small part of the moon's orbit, which is 360 degrees, eclipses happen but seldom; however, in no year can there be fewer than two, and there may be seven of the sun and moon together; but taking one year with another, there are about four each year. But as the sun and moon spend as much time below the horizon of any place as above it, half the number of the eclipses will be *invisible* at any particular place, and consequently there will be only *two* eclipses visible in a year at that place: the one of the sun and the other of the moon.*

Every eclipse, whether of the sun or moon, is visible at some place of the earth's surface, and invisible at others; for the rational horizon of every place divides both the earth and heavens into two equal portions or hemispheres; and as no celestial body can be seen except it be above the spectator's horizon, it follows that any eclipse which is visible in one hemisphere cannot be visible in the other, because the body which is eclipsed is below the horizon of that other. If a lunar eclipse, for example, happens at any hour of the night, between the time of sun-setting and sun-rising, at any particular place, it will be visible there and invisible to the inhabitants of the opposite hemisphere, who have the sun above their horizon at that time; for the sun and moon are in opposite parts of the heavens at the time of a lunar eclipse. And with respect to solar eclipses, it is evident that they can only be seen at any place when the sun is above the horizon of that place. There is, however, a difference with regard to the visibility of a solar and lunar eclipse; for an eclipse of the moon has the same appearance to all the inhabitants of that hemisphere to which the moon is visible at the time, owing in part to the small distance of the moon from the earth. But an eclipse of the sun may be visible to some places and invisible to others in the same hemisphere of the earth, because the moon's shadow is small in comparison of the earth; for its breadth, excluding the penumbra, is only about 180 miles, even in central eclipses.† Hence, those places which are considerably distant from the path of the shadow will either have no eclipse at all, or a very small one; while places near the middle of the shadow will have the greatest possible. There is also a difference in the absolute time at which a solar eclipse happens at the various places where it is visible; for it appears more early to the western parts, and later to the eastern, on account of the motion of the moon (and of course her shadow) from west to east.

In most solar eclipses the moon's disc may be observed by a telescope to be covered by a faint light, which is attributed to the reflection of light from the illuminated part of the earth. When the eclipses are total, the moon's limb is surrounded by a pale circle of light, which some astronomers consider as an indication of a lunar atmosphere, but others, as occasioned by the atmosphere of the sun, because it has been observed to move equally with the sun, and not with the moon.

Dr. Halley, in describing a central eclipse of the sun, which happened at London in April, 1715, says, that although the disc of the sun was wholly covered by the moon, a luminous ring of a faint pearly light surrounded the body of the moon the whole time, and its breadth was nearly a tenth of the moon's diameter.

In lunar eclipses, the moon seldom disappears entirely; and on some occasions even the spots may be distinguished through the shade; but this can only be the case when the moon is at her greatest distance from the earth at the time of the eclipse, for the nearer the moon is to the earth the darkness is the greater. In some instances the moon has disappeared entirely; and the celebrated astronomer, Heraclius, has taken notice of one where the moon could not be seen even with a telescope, though the night was remarkably clear.

Although eclipses of the sun and moon were long considered by the ignorant and superstitious as presages of *evil*, yet they are of the greatest use in astronomy, and may be employed to improve some of the most important and useful of the sciences. By eclipses of the moon the *earth* is proved to be of a *globular* form, the sun to be *greater* than the *earth*, and the *earth* greater than the *moon*. When they are similar in all their circumstances, and happen at considerable intervals of time, they also serve to ascertain the real period of the moon's motion. In geography, eclipses are of considerable use in determining the longitude of places, and particularly eclipses of the moon, because they are oftener visible than those of the sun, and the same eclipse is of equal magnitude and duration at all places where it is seen. In chronology, both solar and lunar eclipses serve to determine exactly the time of any past event.

For the purpose of finding the longitude at places on the earth, eclipses of Jupiter's satellites are found much more useful than eclipses of the moon; not only on account of their happening more frequently, but on account of their instantaneous commencement and termination.

When Jupiter and any of his satellites are in a line with the sun, and Jupiter between the satellite and the sun, it disappears, being then eclipsed, or involved in his shadow. When the satellite goes behind the body of Jupiter, with respect to a spectator on the earth, it is said to be *occulted*, being hid from our sight by his body, whether in his shadow or not. And when the satellite comes into a position between Jupiter and the sun, it casts a shadow on the face of that planet, which is seen by a spectator on the earth as an obscure round spot. Lastly, when the satellite is in a line with Jupiter and the earth, it appears on his disc as a round black spot, which is termed a transit of the satellite.

As those phenomena appear at the same moment of *absolute* time at all places on the earth to which Jupiter is then visible, but at different hours of *relative* time,* according to the distance between the meridian of the places at which observations are made, it follows that this difference of time converted into degrees will be the difference of longitude between those places. Suppose, for example, that a person at London observed an eclipse to begin at 11 o'clock in the evening, and that a person at Barbadoes observed the same at 7 o'clock in the evening, it is certain the eclipse was seen by both persons at the same moment of absolute time, although there is four hours difference in their manner of reckoning that time; and this converted into degrees (at the rate of 15 degrees to an hour) is the difference of longitude between these two places; therefore, Barbadoes is 60 degrees *west* from London, the time not being so far advanced there as at London.

Another phenomenon, somewhat similar to an eclipse, sometimes takes place, by which the longitude of places may be determined, although not quite so easily, nor perhaps so accurately, as by the eclipses of Jupiter's satellites. This is the hiding or obscuring of a fixed star or planet by the moon or other planet, which takes place when the moon or planet is in conjunction with the star. Appearances of this kind are termed occultations. They are very little attended to except by practical astronomers, who employ them for the correction of the lunar tables, and settling the longitude of places, as already stated.

Chinese Mode of Computing.—The Chinese method of computing is by a kind of abacus, which they call a *Swampwan*, "counting-board." It consists of a frame of wood, of various sizes, divided into two unequal compartments, by a bar placed crosswise, at about one-third the length from the top. Through this bar, at right angles, are inserted a number of parallel wires, and on each wire, on the lower compartment, are five moveable balls, and in the upper two. These wires may be considered as the ascending and descending powers of a numeration table, proceeding in decimal proportions; so that if a ball on any of the wires in the larger compartment be placed against the middle bar, and called unity or one, a ball on the next wire above it will represent ten, and one on the next one hundred; so also a ball on the next lower, one hundredth; and the balls on the corresponding wires in the smaller compartment will, in the same manner, represent five, fifty, five hundred,—five tenths, five hundredths, &c. the value or power of each of those in the smaller division being always five times as much as those in the larger. In China almost every trade has a distinct system of secret numbers, that is, instead of using the proper characters for designating prices, they adopt other characters, by which they arbitrarily express their meaning, so as to be understood only by persons of the same trade.—[Martin's History of the British Colonies, Vol. I., Asia.]

Action of Heat upon Razors.—It has been asked why, in time of frost, a razor, unless it be warmed, will not cut without irritating the skin? It is because, when it freezes, the edge of a razor, examined by a microscope, is like a saw, and, as soon as warmed, becomes smooth.

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* If there be seven eclipses in any year, five of them must be of the sun and two of the moon.

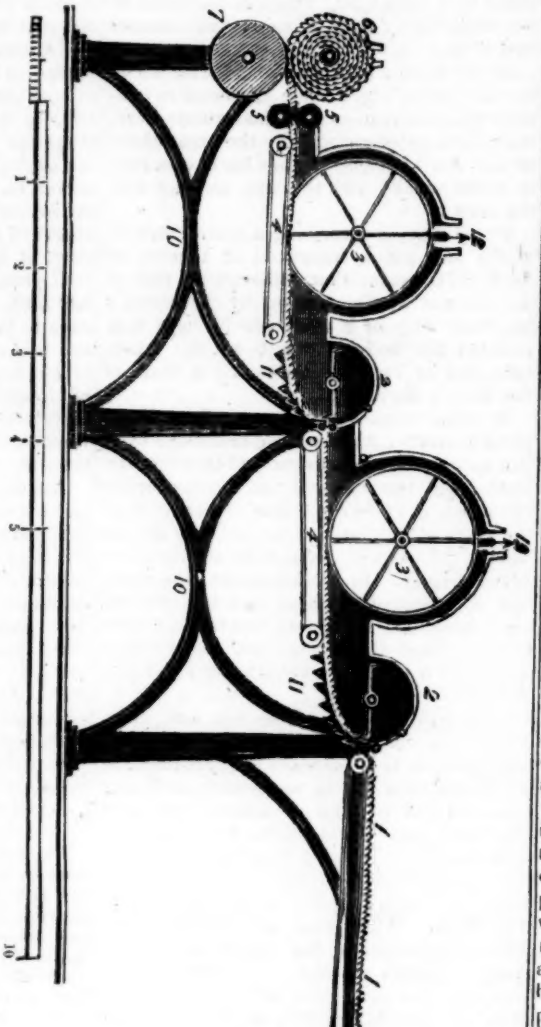
† A [penumbra is the faint shadow produced by an opaque body when opposed to a luminous one.

* *Absolute* time is that which is computed from the same moment; *relative* is that which is computed from different moments.

View of a Cotton Scutching and Lapping Engine, on the most improved plan, the first one invented, by N. Snodgrass, *of Glasgow, in* 1806. [Communicated by the Inventor for the Mechanics' Magazine and Register of Inventions and Improvements.]

EXPLANATION.

1, 1, Feeding table, with cotton weighed and spread upon it.
2, 2, Scutcher cylinders, 11 inches diameter, to run 1500 revolutions per minute, with covers of iron.
3, 3, Wire gauze cylinders, with covers, to spread the cotton, and let off the air generated by the scutcher cylinders.
4, 4, Feeding cloths and moving wooden rollers, to carry the cotton under the wire cylinders from scutcher to scutcher.
5, 5, Two cast iron rollers, 4 inches diameter, to compress the cotton before it is lapped up on roller No. 6, for the cards.
6, Cotton roller, for the carding engine.
7, An iron or wooden cylinder, about 15 inches diameter, under cotton roller, for winding up the same.
10, 10, A view of one side of the cast iron framing.
11, 11, Triangle ribbed hooks, for extracting the gins, &c. from the cotton, and allowed in Europe to be an important part of the scutching engine.
12, 12, Air apertures, for letting the generated air escape through the gauze wire covered cylinders.
~~~~~~~~~~ This represents the cotton in process.



New-York, May 14, 1834.

To the Editor:

Sir,—A few weeks ago I took the liberty of sending you a plan (not mine) for blasting iron ore furnaces with hot air,* successfully in use in Scotland, whereby thirty-three per cent. of fuel is said to be saved; also, a plan of mine for heating factories on the best principles, by steam: in hopes these might benefit this rising country. From the same motive, I again send you another plan of a scutching (batting) machine, for opening, cleaning, and, in one operation, preparing it to be applied to the carding engines; the first one invented by me, in Messrs. G. Houston & Co.'s large spinning factories in the town of Johnstone, Scotland, in 1806, and successfully introduced to the spinning trade in Britain, and, *I believe*, never before in any publication.

The section plan annexed is drawn on a necessarily small scale, to suit the limits of magazines, and is only calculated to suit the understanding of the first rate cotton machine makers, such as Mr. Rodgers, &c. at Paterson. The plan shows all the essential working parts: the various complicated movements, &c. will be easily arranged by these gentlemen, and almost impossible to be exhibited in yours, or any other similar publication. All that I have to observe, in addition to the explanation accompanying the drawing, for the practical working of the machine, in cotton factories, is, that this machine should be made the same breadth of the carding engines, so that the finished lap, No. 6, would suit on applying it. Also, the first feeding cloth, Nos. 1, 1, should be divided into such parts as the manager of the work may think proper, then causing the person that attends the machine to weigh a certain weight of cotton, and carefully spread that weight on each of these parts, which has the effect of enabling the small scutching cylinders to open the cotton more regularly; and, finally, finish the lap, for carding, in the most perfect manner, doing as much work, and better, with one person, than if more were employed, which is the case with those cotton factories I have been permitted to examine in this country. Also, from twenty-eight years' experience, I decidedly recommend, in no case, to make the scutcher cylinders more than *twelve* inches in diameter, and only with two blades. In the mean time, I am, Sir, yours, &c.,

Neil Snodgrass, 87 Pearl st.

* Which will be inserted shortly.—[Ed. M. M.]

The New Pin.—There are few things which more strikingly exemplify the high point of civilization to which this country has attained than the amount of capital continually expended, the inventive talent exercised, and the powerful agencies employed, as the remedy of exceedingly small evils, and the attainment of equally minute objects of convenience. This remark cannot perhaps find a better illustration than in "The New Pin with an Immoveable Solid Head." The defect in the old pin, which it is the object of the present improvement to remedy, is that the head of the pin being separately spun and then put on, was liable to be detached by the pressure of the thumb. The principle of the improvement consists in this: that the head being formed of the same piece with the body of the pin, the inconvenience attending its slipping is effectually prevented. This is the minute improvement in a minute article, the accomplishment of which has cost the patentees several years of attentive application, and the expenditure of a large capital, according to their own statement, which, when the extent and character of the machinery employed are considered, there can be no reason to doubt. At the same time, it must be taken in connection with this improvement, that the patent pin is altogether produced by machinery, instead of partly by hand processes. "The Patent Solid-headed Pin Works" are situated about a mile from Stroud, on the Bath and Birmingham road. The principal building consists of five floors, each of them one hundred feet in length, and completely filled with machinery. A large iron water-wheel, on which a stream acts with a power equal to that of forty horses, gives motion to all the mechanical apparatus, which is so ingeniously constructed as to perform every essential operation for converting a coil of wire into the perfect pin with scarcely any noise and little apparent effort. Upon the old system, this comparatively insignificant article had to go through fifteen or sixteen hands before it was finished; but this curious machine effects the whole without manual assistance, or any extraneous aid whatever; for the wire being placed on a reel, and the machine set in motion, all the mechanical combinations, so numerous and dissimilar in their movements, are simultaneously performing their various functions with a rapidity and precision truly surprising. While one portion of the apparatus is drawing out and straightening the wire, and cutting it off at the required length, another combination is pointing and polishing the pin, and another compressing a portion of the wire into dies to form a perfect and neat round solid head. The various movements are completely at command, and susceptible of instant alteration and adjustment to pins of any length, and heads of any form, while the machine is working at its ordinary speed. Each machine operates on four wires at once, and from forty to fifty pins are with facility produced in a minute by each of the 100 machines which are completed, and in constant operation at the works. As a more particular detail of the process would not be well understood without engravings, we shall only further state that the works, with the present number of machines, are capable of producing upwards of two tons of pins weekly, or, stating the amount numerically, 3,240,000 pins daily, 19,440,000 weekly, supposing all the machines to be in operation twelve hours daily. It is stated that altogether twenty millions of pins are daily manufactured in this country for home consumption and for the foreign market.—[Penny Magazine.]

Years.—The word Year is purely Saxon, and is supposed by some to be derived from *æra:* whilst others deduce both words from the Greek *ear*, or Latin *ver* (Spring); because many of the ancients were in the habit of dating the commencement of the year from spring. In the Hebrew, Greek, and Latin languages, the word *year* is expressive of a ring or *circle*. The Egyptians also represented it by a snake placed in a *circular* position, with its tail in its mouth; whence, perhaps the name of the *Zodiac*, or that *imaginary* circle which is made by the sun in the heavens, during the twelve
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months. The time in which the sun performs its journey through the twelve *signs* of the Zodiac comprehends 365 days, 5 hours, 48 minutes, and 48 seconds, and is therefore styled the Natural, Solar, or Tropical Year. The Sidereal, or Astral year, is the time which elapses from the sun's passage from any particular fixed star, until its return to it again, and is just twenty minutes and twenty-nine seconds longer than the natural or solar year. The Lunar year consists of twelve lunar months, or that period during which the moon passes twelve times through its various phases, or changes. The common or civil year, in use with us and established by law, contains 365 days during *three successive years*, but in each *fourth* year an *intercalary* or additional day is inserted, in order to make up the number 366, such additional day being considered equivalent to the time lost by not counting the five hours and forty-nine minutes at the end of each of the four years, from one Bissextile or Leap year to another. The word *leap* sufficiently explains the act of passing over the hours in question. This plan was invented by Julius Cæsar, or by Sosigenes, the Egyptian mathematician, who assisted him in rectifying the Calendar. The additional or *intercalary* day is with us always placed in the month of February, which consequently in *Leap Year* consists of twenty-nine days, the usual number being twenty-eight. Cæsar placed it in the month of March, by reckoning the sixth day of the calends of that month *twice over*, hence the term *Bissextile*, from the words *bis* (twice) and *sex* (six), or *sextilis* (sixth day). But by the Gregorian alteration, the fourth year coming at the close of a century is not a leap year, unless the number of hundreds be a multiple of four. Thus 1600 was a leap year, 1700 and 1800 were not, 2000 will be. The reckoning of time by the course of the sun or moon was attempted in various ways by different ancient nations; but they, finding that their minor divisions of time did not correspond with the courses in question, endeavored to prevent confusion by ordaining a certain number of days to be *intercalated*, or inserted, out of the common order, so as to preserve the equation of time. The *Egyptian* year (as used by Ptolemy) consisted of 365 days, which were divided into twelve months of thirty days each, besides five *intercalary* days at the end. The Egyptian *Canicular*, or *natural* year, was computed from one *heliacal* rising of the star Sirius, or *Canicula*, to the next. By the regulation of Solon, the ancient *Greek* year was *lunar*, and consisted of twelve months; each containing thirty and twenty-nine days, alternately; and, in every revolution of nineteen years, the third, fifth, eighth, eleventh, sixteenth, and nineteenth, it had an *intercalary* month, in order to keep the New and Full Moons to the same seasons of the year. The ancient *Jewish* year was the same as the Greek one, only that it was made to agree with the Solar year by adding eleven and sometimes twelve days at the end; or an *intercalary* month when necessary. The modern *Jewish* year consists of twelve lunar months generally; but sometimes of thirteen, that is, when an *intercalary* month is inserted. The *Turkish* year consists of twelve lunar months of thirty and twenty-nine days alternately, sometimes of thirteen. The ancient *Roman* year, as settled by Romulus, was *lunar*, but contained only ten months, which were irregular, and comprehended 304 days in all; being a number fifty days short of the true *lunar* year, and sixty-one days of the *solar*. Romulus added the requisite number of days at the end of the year. Numa Pompilius added two months, making the year to consist of 355 days, thereby exceeding the *lunar* year by one day, but being short of the *solar* one by ten days. Julius Cæsar, during his third consulship, and whilst he was Pontifex Maximus, or high priest of Rome, reformed the calendar by regulating the months according to their present measure, and adding an intercalary day every fourth year to the month of February; but he being assassinated before his plan could be fully brought into operation, the Emperor Augustus perfected and established what his kinsman had begun. The *Julian* year, which consisted of 365 days and 6 hours, was, however, still incorrect; for it was found to be too long by about 11 minutes, which in 131 years would be equal to one day; consequently, there was a further reformation of the calendar by Pope Gregory, in the 1582. He cut off eleven days, by calling the fourth of October the fifteenth. This alteration of the *style* was gradually adopted in the several countries of the European continent; bnt in Russia, in some of the Swiss cantons, and in the countries of the East, the *old style* is still preserved. The Parliament of England adopted the *Gregorian* plan, in 1752, by enacting that eleven days should be *omitted* that year, all dates therefore, previous to 1752, are said to be according to the Old Style: whilst those since that period are deemed to be according to the New Style. In 1800, which was properly a bissextile, or leap year, the intercalary day was omitted; hence the difference between the old and new style is now twelve days. The *Gregorian* regulation does not absolutely preclude all error in future; but that is likely to be so trifling, as not to require particular attention. The beginning of the year has by no means been the same in different ages and countries. The Chaldeans, the Egyptians, and the Jews, in all civil affairs, began it at the *autumnal equinox*. The ecclesiastical year among the Jews, the common year of the Persians, and of the Romans under Romulus, commenced in spring: a mode still followed in many of the Italian states. Both the *equinoxes*, as well as the *summer solstice*, were each the commencing date in some of the states of Greece. The Roman year, from the time of Numa, began on the calends of January; the Arabs and Turks compute from the 16th of July; the christian clergy formerly commenced the year on the 25th of March *—a method observed in Great Britain, generally, in civil affairs, until 1752; from which period our civil year has begun on the 1st of January, except in some few cases, in which it still commences on the "Day of Annunciation," or the 25th of March. In Scotland, the year was, by a proclamation, bearing date so early as the 27th of November, 1599, ordered thenceforth to commence in that kingdom on the 1st of January, instead of the 25th of March. The English Church, still, in her solemn service, renews the year on the *First Sunday in Advent*, which is always that next to or on *St. Andrew's Day*. Our ancestors, after the establishment of Christianity, usually began their year at *Christmas*, and reckoned the commencement of their *æra* from the incarnation, or birth of Christ. William the Conqueror, however, introduced the method of substituting the first year of his own reign for the Christian æra. At subsequent periods, the English reverted to the ancient custom; but all State proclamations, patents, charters, and acts of Parliament, have continued to be dated from the commencement of the reigns of the respective sovereigns, with the addition of the words, "and in the year of our Lord," &c. The Russian government did not adopt the Christian æra until the time of Peter, in 1725; their previous practice had been to reckon from the world's age, or the *year of the creation*.

* The Church of Rome dated from the Sunday succeeding the full moon which occurred next after the vernal equinox; or, if the full moon happened on a Sunday, the new year commenced on that day.

AN IMPROVED BEE HIVE.—The box or hive to be made of inch plank, say about two feet three inches by twelve inches wide; the upper part of the box to be partitioned off, allowing just space sufficient to admit a drawer of about ten by twelve inches deep. This drawer is to slide upon the horizontal partition, and to be made to fit the inside of the box exactly. In the bottom of the drawer a hole is to be made, say about one and a half inch in diameter, and a corresponding one in the partition, so as to allow the bees to pass up from the lower part of the hive into the drawer. In the outer side of the drawer, a pane of glass is to be fixed, in order to ascertain when the drawer is filled with honey. Over the glass, a sliding shutter is to be placed, to exclude the light; or the upper end of the plank, forming the back side of the box, or hive, may be sawed off, and fastened with a hinge and button, so as to answer in place of the sliding shutter. When the honey is wanted for use, remove the shutter from before the glass, and having ascertained that the drawer is filled, introduce a little *smoke* into the top of the drawer by means of a tobacco pipe; and when the bees have been driven into the lower part of the hive, separate the drawer and partition with a case knife, remove the drawer, and having emptied it, return it to its place again, and the bees will commence working in it immediately. By this method the honey will be always pure, without bee-bread, or dead bees, and not a single bee need be destroyed; and moreover, it has been tested by many years, trial, and found to answer the intention completely. Z.

P. S.—The drawer should have a top *screwed* on, so as to be more readily opened when the honey is to be taken out; and any space between the drawer and the sides, or top of the hive, should be filled with some kind of cement, so as to prevent insects from making a lodgment within the hive.

EXPORTS FROM NEW-ORLEANS.—The Governor of Louisiana, in his late message to the Legislature, estimates the exports of New-Orleans for the year 1831, at $31,700,000, as follows:

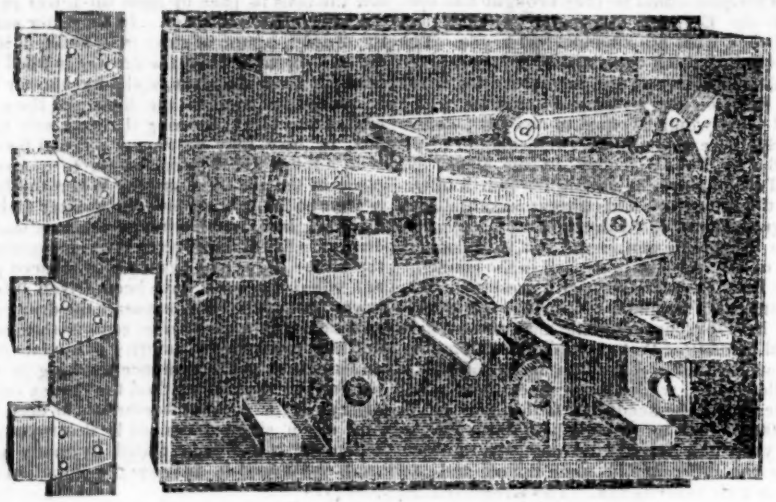
Cotton 450,000 bales at $55 . .	$31,640,000
Tobacco 30,000 hhds. at $10 .	1,200,000
Sugar 70,000 hhds. at $65 . .	4,550,000
Molasses 3,500,000 gallons at 20 cts.	700,000
And for western produce	5,500,000

from the sum of which he deducts $22,000,000 for home consumption—leaving the aggregate as above.

NEW IRON STEAMBOAT, &c.—We recommend to the attention of the public, the advertisement of our late highly enterprising and public spirited townsman, G. B. Lamar, Esq. (now of Savannah,) whose efforts in facilitating the river communication between this city and Savannah—and particularly the present one, now nearly completed, of a new Iron Steamboat—are worthy of the highest praise, and we hope will insure to him the great success they merit. This Iron Boat is the first of the kind ever introduced into this country, and we doubt not will prove to be one of the most valuable commercial facilities it possesses.—[Augusta Chronicle.]

QUIETUDE.—Happy, indeed, would be the condition of mankind, were all disposed to cultivate that harmony and friendship so desirable and necessary to the welfare and prosperity of society—the world would be similar to a paradise, and the people, if not angels, would approach the character ascribed to them—mankind, as they ought to be considered, would present a band of brothers, happy, quiet and content. Our citizens, from the highest to the lowest, would be satisfied with their respective stations, and the agitation which now pervades society would rest in quiet and repose.

If there is any quiet on earth, the farmer may be said to enjoy it: with a competence in store, the honest fruits of his industry, he thrives secure from the turmoils of those who pursue other avocations for subsistence. The mechanic, the professional man, and all who support themselves by speculative measures, must expect to contend against the current of disappointment, and prop their sinking hopes by anticipating future prospects, and although their situation may appear enviable to the unscrutinizing eye; on the contrary, they have abundant reason to envy those who live on the fat of the land, enjoying the bounties dealt out by Nature with a liberal hand.

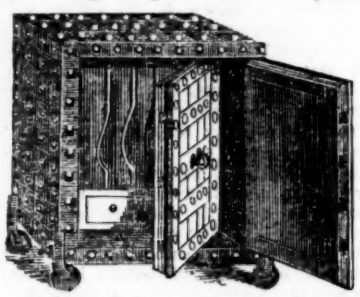


CHUBB'S PATENT LOCK.—The lock made by C. J. Gayler, of 102 Water street, New-York, of which a drawing is annexed, affords more security than any other yet invented, as *it cannot be picked* or opened with any false instrument; and its combinations are so extensive that tens of thousands may be made without making two alike.

Description—A A *a*, the bolt; *b*, the square pin of the bolt; *c c*, the detector, moving on the centre *d*; *f*, the detector spring; *g*, four tumblers, moving separately on the centre *h*, shown lifted by the key to the exact position for the square pin *b* of the bolt to pass, in unlocking. Should one or more of the tumblers be lifted by a pick or false key, in the least degree beyond their present position, the detector, *c c*, being thus overlifted, will, by the angle of the spring, *f*, pressing on the opposite side of the angle of the detector, force its hook into the notch *a* of the bolt, and be firmly held so, until disengaged by the regulating slide K *k;* in which case, by the introduction of the key, the tumblers are lifted to the regulating combination, and admit the stud *n*, affixed to the regulating slide, to enter the several grooves, *o*, in them; the bevelled end *k* of this slide, by the same movement, pressing against the hook of the detector, disengages it from the notch *a* of the bolt.

It possesses the four principal requisites of a good lock, namely, security, simplicity, strength, and durability; its security, particularly, is increased beyond calculation, by an improvement (the detector) which not only renders it impossible to be picked, but also *detects the first attempt to do so,* thereby preventing those repeated efforts to which all other locks are exposed: at the same time it will be noticed that the thief, in making the attempt, renders the lock more secure, for if the detector is (as it must be in such cases) overlifted, it will force its hook into the bolt, and will there remain until it is disengaged, *which can only be done with the true key,* in the following manner: the key must be turned half way round in the lock in the same way as in locking; then turn back again, and then turn round in the usual way to unlock. If an attempt has been made to pick the lock, the detector will be overlifted, and catch in the bolt; this circumstance will at once be known, when the true key will not open the lock until the detector is disengaged in the way above mentioned. As to its durability, it is not liable to be injured by constant use; this has been fully ascertained by a lock having been locked and unlocked by steam power *four hundred and sixty thousand times* without receiving the least injury.

Mr. Gayler makes use of this lock in all his Double Fire Proof Chests, of which the annexed engraving is a correct representation. They have been several times tested by fire, and have afforded perfect security to valuable books and papers. They are now in use in upwards of fifty banks in the United States, as well as in record and other public offices, and for such purposes are preferred to vaults, as they are equally safe against fire, are free from damp, and can be removed from one building to another with little trouble or expense.



STEREOTYPE METALAGRAPHIC PRINTING.—*By Dr. Alexander Jones, of Mobile, Alabama.*—I offer this name, as I have nothing better to designate it. It means simply the transferring of printed letters, from the pages of a book, or newspaper, to the polished surfaces of metallic plates, especially of soft iron. My experiments are not yet completed, yet I feel satisfied that the result is entirely a practicable one, if carefully conducted with proper instruments.

The best plan on which to conduct the experiment is as follows: Take two plates of very soft iron, of moderate dimensions, give one face of each a very true and fine polish, so that, when applied by these faces, they shall uniformly fit and adhere together. Moisten two slips of printed newspaper, or parts of a leaf from a book, of the size of the plates, apply one to the polished face of each plate, and interpose between them a fold or two of silk paper, and then clamp the plates together. Give them a gentle heat over the fire, then place them in a vice, and apply a strong screw power. On separating them and gently removing the paper, the letters will be seen, distinctly formed on the faces of the two plates. Now, as printer's ink is formed of *lamp-black and oil,* upon which acid acts very little, the faces of the plates may be slightly touched over with diluted sulphuric or nitric acid, which, if skilfully applied, acts on the iron, and leaves the letters raised. When the printer's ink contains some bees-wax, the experiment is more complete. These plates, once formed, may be converted into steel, on the plan of Mr. Perkins; after which they would probably print from 10,000 to 20,000 copies without being materially defaced. An expert mechanic, with proper machinery, could in a day or two form a sufficient number of plates to print off 20,000 copies (500 pages) of an octavo volume.

Other metals, as copper, brass, and type metal, with slight variations, can all have letters transferred to them in the same manner, and can be used as printing plates; but none of these will have the durability of iron. —[American Journal of Science.]

FORCE OF TRACTION.—Experiments uniformly show that the force of traction is, in every case, nearly in an exact proportion to the strength and hardness of a road. The following are the results: On a well made pavement, the power required to draw a waggon is 33 lbs.; on a road made with six inches of broken stone of great hardness, laid on a foundation of large stones, set in the form of a pavement, is 46 lbs.; on a road made with a thick coating of broken stone, laid on earth, the power required is 65 lbs.; and on a road made with a thick coating of gravel, laid on earth, the power required is 147 lbs. Thus it appears that the results of actual experiments fully correspond with those deduced from the laws of science."—[Parnell's Treatise on Roads.]

Climate and Physical Resources of Illinois, and Prairie Regions. By H. [From the N. Y. American.]

PEORIA, Illinois, March, 1834.

I have gone through a variety of amusing and some vexatious adventures in crossing the country from Galena to this central place; but you have now been with me so long upon the prairies that I shall not fatigue you by detailing more of a traveller's passing mishaps and petty encounters. The great melting of the snows that detained me at Galena, was followed by a sharp frost, which, crusting over the swollen streams, made their passage very painful for the horses. In passing through the Winnebago swamp, we drove for the distance of a mile through water up to the chests of our horses, and so heavily coated with ice, that it was as much as the leaders could do to break a way with their fore feet. My fellow traveller, however, for I started with but one from Galena, proved to be an old campaigner and capital travelling companion, and we managed to extract some amusement from every occurrence, however annoying; and whether we were jolting over the frozen ground in an open wagon without springs or seats, or keeping the freezing night-wind away by stuffing our bed clothes in the crevices, as we shared a pallet together in some half constructed log edifice, the spirit of fun and good humor has been sympathetic between us.

About a day's journey from Galena, we passed over a reach of prairie, some 12 or 14 miles in extent, where my companion, who is a middle-aged man, was fortunate enough, a few winters ago, to be the cause of saving a great many lives. A train of sleighs, holding more than a dozen people, among whom were several females, started immediately after breakfast to cross this narrow arm of the prairie; and though the distance was only as I have stated it, they contrived somehow to lose their way in the snow, and night closing in found them apparently as far from the house they were seeking, as when they started in the morning. They had, in fact, during a sudden flurry of snow, turned completely round, and, as my companion was the first to discover,

were actually going backwards instead of advancing on their route. A council was at once held, and all except my friend were for still pushing forward, though the horses were worn down with fatigue, and several of the travellers already frost bitten or becoming torpid with cold. But my companion, who probably had more experience in such scenes than any of the company, immediately took command and ordered a halt, declaring that he would not move a step further, and warning them that they would perish should they not make use of the few moments of light that were left them to secure themselves for the night. Providentially every one yielded to him. The horses were turned loose, and the snow having been removed from a large space of ground, it was forthwith covered with buffaloe skins, and the largest sleigh in the train placed inverted upon them. The whole company then, with the exception of my friend, crawled beneath the impending structure, while he remained outside and covered up the box with snow, shovelling it on with a piece of board. This exercise—which alone saved his life, while it insured the safety of theirs—he continued till morning, when some of the horses having found their way into the settlements, the people came out and led the company to their homes. During the same spell of weather, if not on the same night, two waggoners and some oxen were frozen on the prairie, farther down the country, on a route which I have since passed. There were three of them in company, each with a team, haling* goods to some point on the Illinois. Finding their oxen gradually becoming stiff with cold, they determined to leave them and hurry on to a house. One of the three gave out before they had gone many miles, and his companions buried him in a snow bank; the second sank down on the road; and the third only succeeded in reaching a house and saving his life.—Part of the load of these poor fellows consisted of blankets, which, had they known, it might have saved them. The incident struck me when told near the spot on a cold day, though not so much as a similar story which I heard when I first came upon the grand prairie in Indiana. It related to the fate of an emigrant who attempted to cross a broad arm of the prairie with his family, in an open wagon, on a very cold day. They were found stiff in the road, the horses frozen in their traces, and standing upright, as if petrified by some sudden influence, and the man leaning against the wagon, with a fragment torn from it in his hands, as if in the act of trying to make a fire. The mother sat upright, with an infant in her arms, but the children were curled about her feet in every position that an attempt to screen themselves from the cruel exposure could suggest. But these stories, of which I could tell you a hundred, begin now to lose their effect, as with the gradual opening of spring I find myself approaching a milder region. The last day's travel has led along those sunny bottoms of the Illinois, where, even at this early season, the chattering of the paroquet may be heard upon every side; and here and there I have delighted to observe a tender green stealing over those sheltered meadows beneath the retreating banks of the river, whose narrow limits and basin-like appearance answer so completely to my preconceived ideas of a prairie. The Illinois about 30 miles above this point expands into a fine lake, upon the banks of which Peoria is situated. The site is one of the prettiest for a town that I ever saw, and the approach to it, through alternate prairies and richly wooded bottoms, that fringe the lake with a vegetation of stupendous growth, and give glimpses of its sparkling waters and blue islets through festoons of vines that overhang the road for miles continuously, must in summer be like a scene of fairy land.

Peoria is about the geographical centre of Illinois, though by no means as yet the centre of population, which is still far to the southeast. This place is rapidly improving, and may very possibly become the future seat of Government. It has inexhaustible quantities of bituminous coal in its vicinity, and commands an unbroken steamboat navigation with St. Louis. The adjacent country is very fertile. The soil, like that of Illinois generally, is better suited to the grazier than the agriculturist. It is composed of a black and rich mould, with a small admixture of fine silecious sand, and rests on soft and permeable clay without being interspersed with stone or gravel. This formation, as is observed by Governor Coles in an excellent address before a scientific body in Illinois, whilst it is unfavorable to the existence of perennial streams and fountains, and impedes the plough of the agriculturist, and endangers his health by the creation of miasma, in the vicinity of the middle lands, furnishes inexhaustible meadows to the grazier, and every facility for canals and railroads. The Illinois river was described by Gen. G. B. Clark so long ago as 1777, as "a natural canal passing through natural meadows;" and the facility with which branches might be made as the country requires them, is now very apparent. The route of the proposed canal (of which I have before spoken) to connect the waters of Lake Superior with those of the Gulf of Mexico, by a communication of only one hundred miles, commences at a point on the Chicago river, five miles above its mouth, where the water is 12 feet deep, and on a level with Lake Michigan: thence seven miles and a half to the summit level, which is 17 feet above the surface of lake Michigan, and five feet nine inches above the Deplaine: thence (for a ship canal,) down the valley of the Deplaine and Illinois, about 90 miles, with 175 feet descent to the mouth of the little Vermillion, four miles below the rapids of the Illinois river; at which point that stream is navigable for steamboats at all seasons.

Ten years, and $40,000 have now been spent upon this work, and not a shovel-full of earth, so far as I can learn, is yet removed from the soil. Let the New York merchants step in and make it, and the warehouses of Buffalo will be to St. Louis what those of New Orleans are at present. New York will have the whole trade of the Mississippi valley, and the vast regions of the Missouri will be tributary to her market. A canal boat that can navigate the lakes may then clear at Coenties slip and discharge her cargo at a trading post on the Yellow Stone. Such a canal would be to this Union what a cut through the Isthmus of Darien would be to the world. The one would draw St. Louis as near to New York as the other would India to Europe. It would be well indeed that Government should make it; but the means required are so slight, in comparison with those invested in a hundred similar works in different parts of the country, as to bring it easily within the limits of individual enterprize. The State of Illinois, judging from the progress already made, will not complete the canal for half a century to come. The want of capital is here so great as almost to seal up each outlet for enterprize, though they present themselves on every side; and our eastern capitalists are so completely ignorant of the prodigious resources of this region, that it may be long before the defect is supplied. Were the people in our rich eastern cities more familiar with even the geographical relations of this extraordinary region, I am convinced that more than one company would be formed, that would be eager to purchase from the State of Illinois, at a handsome premium, the right of making the canal and holding it in joint stock for a term of years. When people of capital and enterprize open their eyes to this matter, the work will be accomplished in three seasons, and as you may then take a steamboat at Buffalo and check a berth for St. Peters, a trip to the Falls of St. Anthony will soon be thought no more of, than is now an excursion to Niagara. Fishing parties will be made up at Islip for lake Pepin; and Hewitt will furnish portfolios to tourists that wander away to sketch the awful scenery of the (now) remote "Thunder's Nest,"* while "the Tetons of the burnt wood" will supply Jennings's larder with game, and Paulding's best Madeira be drank by gentlemen that shoot elk among the Dacotahs.

St. Louis, March, 1834.

Here I am, safely at last in the renowned city of San' Louis. Our route from Peoria, by the way of the flourishing towns of Springfield, Jacksonville, and Alton, through the small meadow-like and half cultivated prairies of Lower Illinois, was very agreeable; and in crossing one prairie of considerable extent, I had the pleasure of seeing it on fire on every side around me. The hour was near midnight, and the spectacle was magnificent beyond description. An illustration by Westall's pencil of The Rich Man in the Burning Lake, which I have seen somewhere, would give as near an idea of the scene as the painter's art could convey. In one place the prairie presented exactly the appearance of a broad burning pool, in others the flames swelled up like seas of fire, rolling the liquid element in solid columns over the land; and then, like the waves of the sea itself, when they break upon the shore, a thousand forked tongues of flame would project themselves far beyond the broken mass, and greedily lick up the dry aliment that lay before them. Our horses did not seem to mind the phenomenon at all, and we drove so near to the fire as to feel the heat very sensibly. But though we probably incurred no danger, it was almost startling at times to see a wall of fire as high as our horses' ears, in some places stretching along the roadside, while the flames would shoot to the height of twenty feet or more, when a gust of wind would sweep the prairie.

We had an accession of four or five passengers at Jacksonville, and I was not a little amused to find that out of six persons in the stage, we had four *colonels*; and when we chanced to stop at a tavern, where I saw a cartridge box and a musket, over the mantelpiece, I could not help remarking aloud, that it was the first symptom of the existence of a private I had seen in the country. Some of the colonels looked a little sour, and the jest might not have passed off as easily as I could have wished it, had not my friend, who was also a colonel, entered my name on the tavern register by the same distinguished title, which, I presume, qualified me to speak a little *ad libitim* of militia deeds of arms.

The population seen in the last few days seemed to be of a very mixed character: some were quakers, from Pemsylvania, and they had every necessary and comfort of life; others again, were miserable looking creatures, from North Carolina and parts of Tennessee, who lived with scarcely any labor, and kept a blanket suspended over their porch instead of a door—in log huts, that had been built for several seasons. At Alton, again I saw, in their neat white houses, with their green venetian blinds—their tasteful pinzzas and pretty enclosures, with newly planted shrubbery—sure indications of a New England population. The same, or even greater marks of improvement and superiority in their style of living, over the mass of emigrants hither, are manifest, I am told, wherever the English have established themselves in Illinois. I have missed all their settlements, by passing to the westward of them. But both here and in Michigan, I have always heard the English residents spoken of with respect and affection.

A few miles below Alton, on the Mississippi, I passed a deserted village, the whole population of which had been destroyed by the "Milk sickness."* The hamlet consisted of a couple of mills and a number of frame houses, not one of which were now tenanted; but the dried weeds of last year choked the threshhold of the latter, and the raceways of the mills were cumbered up with floating timber, while the green slime of two summers hung heavy upon their motionless wheels. Not an object but ourselves moved through the silent town; and the very crows themselves seemed to make a circuit around the fated place when they came in view of the thickly-sown burial ground on the skirts of the deserted village.

We were now on the famous "American bottom;" and I was really astonished at the prodigious size of the trees and the magnificent vegetation which this region displays, but the scattered inhabitants looked far from healthy. At Alton we struck the Mississippi, and a few miles below we passed the mouth of the Missouri, where its white and turbid current could be seen rushing in among the Islands and staining the limpid tide of the Father of rivers far down the western shore, while for twenty miles below that clear stream still preserved its purity on the eastern side. Surely Father Hennepin was mistaken, when he called the streams above and below the Missouri by the same name! For the Upper Mississippi, except in its breadth and volume of water, bears but little resemblance to the Lower river; while the Missouri, as it tears through its muddy banks to drink that beautiful tide, soon gives its own turbulent character to the whole stream below, and even impresses its peculiar features upon the gulf in which it at last loses itself.

It was too late in the evening to cross when we arrived opposite to St. Louis, and I amused myself before retiring for the night, in listening to the sound of the church bells—the first I had heard in many a month—and watching the lights as they danced along the lines of the dusky city, and were reflected in the dark rolling river. We crossed in time for breakfast, and I am now tolerably established at the best hotel in the place. H.

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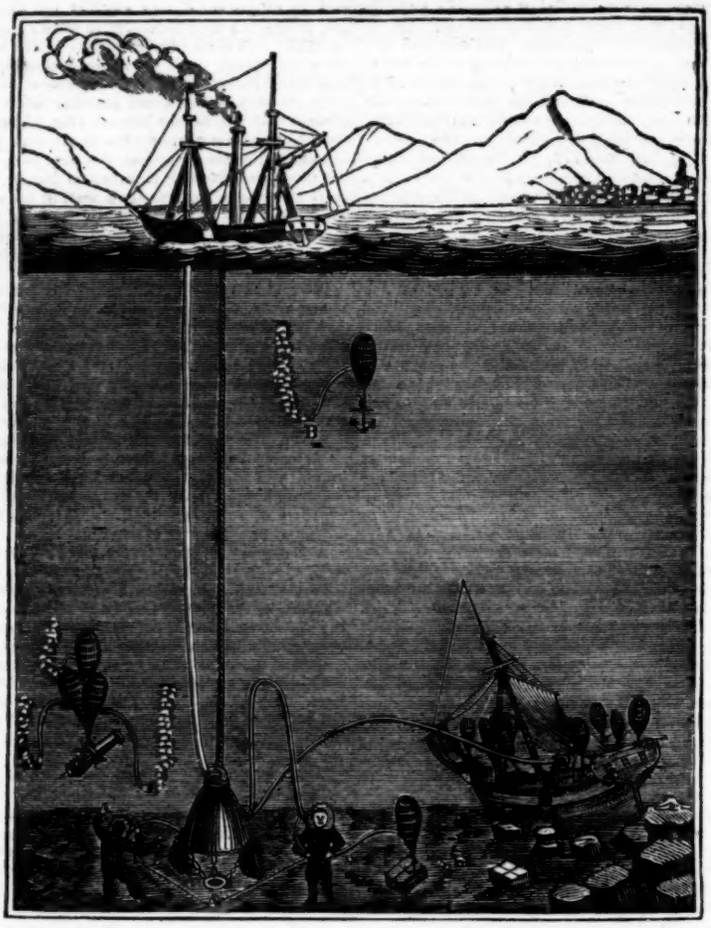
* Pronounced *hauling*: a term universally used at the West instead of its northern synonyme "drawing." They have Shakspeare's authority for it—"I think oxen and wain ropes cannot *hale* them together."—Twelfth Night.

* A young officer of the first Infantry, who commanded an exploring party into this savage region, so called by the Indians, arrived from his tour while I was at Prairie du Chien. He described the scenery as possessing a desolate grandeur which words could not paint.

*A fatal spasmodic disease, peculiar, I believe, to the Valley of the Mississippi. It first attacks the cattle, and then those who eat the beef or drink milk.



Plan for raising Vessels sunk in Deep Water

By Mr. JOHN MILNE, Teacher of Architectural and Mechanical Drawing, Edinburgh. [From the London Mechanics' Magazine.]

SIR,—Having read in a recent number of your Magazine, that Dr. Hancock has proposed the use of *air* as a power for raising goods, &c. from the bottom of the sea, I beg to forward to you a pamphlet of mine published in 1828, which contains, among other plans, two on this very principle. They attracted some share of attention at the time of publication, but neither of them has ever, as far as I am aware, been carried into actual practice. Should you see cause, I shall be glad to find that you have drawn the attention of the public to this important but neglected subject. I am, respectfully, your obedient servant, JOHN MILNE.

The pamphlet obligingly forwarded to us by Mr. Milne,* is entitled "Plans for the Floating Off of Stranded Vessels; and for raising those that have foundered; with an Improved Method of Carrying Vessels over Banks in Shallow Water." Of the two plans to which Mr. Milne more particularly invites our attention, one is adapted to the case of ships sunk near the shore, and the other to deep sea operations. Both are on the same principle—both exceedingly ingenious, and, in our humble judgment, quite practicable. We shall extract the author's description of the first at length, and beg to refer those who may be desirous of further information on the subject, to the work itself, which is altogether well deserving of perusal.

"I shall now describe the application of these air buoys,* to the raising of a vessel that has been sunk in deep water; but before doing so, it may be proper to mention the disadvantages attending the common practice. At present we pass one or more chains round the wreck, and by means of these chains suspend it by one, or between two floating vessels, a process which in deep water is attended with much expense and uncertainty, because no sufficient power can be applied from the floating vessel to raise the wreck at once to the surface. Moreover, from the great weight of the wreck, and from the manner of placing the chains about it, they are liable to cut the timbers of the ship, as in the case of the Comet steam-boat (see Narrative of the Loss of the Comet steamboat). The operators must wait till the lowest ebb of the tide, then, pulling up the ends of the suspending chains and securing them, the rising of the water acting upon the floating vessels, lifts the wreck from the bottom; and while the tide rises, they proceed with their load towards the land, until the suspended vessel again rests upon the bottom, by the water becoming less in depth. Hence, they cannot, during one flowing tide, raise the sunk vessel more than the height to which the water had flowed from its lowest ebb, which at a maximum on the British coast does not exceed sixteen feet, and they must now suspend their exertions till the end of nearly twelve hours.

"Before that period arrives, however, a storm comes on, the workmen desist from their operations, and it not unfrequently happens, that before they can again commence their labors, the object of their toils has broken up, or has been imbedded in the sand.

"These inconveniences being obvious, I propose the following methods. The place of the wreck being ascertained by an improved drag, which at present I shall not describe, let her state be ascertained from a diving bell, and let there also be sent down with it a number of the before-mentioned buoys, in a perfectly collapsed state; and let the diving operator stow them away in that condition below decks, also hooking on as many about the ship as shall collectively be sufficient to buoy it up when inflated; for their inflation let him insert a small copper tube, which is attached to a leathern pipe,* into the nozle of each of the buoys (see engraving, fig. A), which pipe, communicating with the air within the diving bell (air being forced down into the steam-vessel†), will also inject air into the buoys, if they be held up, at the commencement of filling, a little higher than the level of the water at the mouth of the bell.‡ Or these envelopes may be speedily filled, by letting down a number of metallic vessels, charged with thirty or more atmospheres, which being discharged will quickly inflate them at the convenience of the operator, by his turning a common stop-cock, which, in either of these methods, is all he has to do.

"Having, by one or other, or by both of these methods, filled a sufficient number of buoys, the wreck will begin to rise whenever the bags have displaced that bulk of water which is equal to the weight of the wreck while immersed in the same fluid. Let the weight to be raised from a depth of 65 feet be 300 tons avoirdupois, = 672,000 lbs. ÷ 64 lbs., the medium weight of a cubic foot of sea water, = the buoyant effect of 10,500 cubic feet of air discharged from the diving bell at that depth.

"But by using air previously compressed to thirty atmospheres, and discharged at the same depth, and by allowing the capacity of each vessel so charged to be 2½ feet, then 27§ × 2½ = 67½ cubic feet of air discharged from one compressed vessel, × 64 lbs., the buoyant effect of one foot of air in sea water, = 4,320 lbs. buoyant effect of air originally compressed into one vessel; but the load to be raised was 672,000 lbs., therefore, ÷ 4,320 lbs., = 155·5, &c. compressed air vessels, allowing the apparatus to have no

* Author of the excellent "Practical View of the Steam Engine."

* "Leathern bags, well sewed and tanned or barked in the best manner"—"made nearly air-tight, and proof against the attacks of vermin." [p. 5.] Mr. Milne, in a manuscript note on this passage, in our copy of the pamphlet, says: "Open-mouthed vessels of tin-plate would be preferable, to be inverted when in use, and packed into each other when not in use."—[ED. L. M. M.]

* This pipe should be sufficiently long to admit of the operator hooking on other buoys, while one bag is in the act of being filled with air.

† To be stationed over the sunken ship, (as explained in a preceding section of the pamphlet,) and provided with an air-compressing pump and a common blowing pump.—[ED. L. M. M.]

‡ Even the azotic gas discharged by the operators might be employed for this purpose; the quantity of common air deteriorated by them being very considerable. Pepys and Allen, in their Essays on Respiration, state that an easy inspiration is about 16 cubic inches, and that the subject of their experiments made about 19 of these per minute; for which it can be shown by calculation, that four men would discharge from their lungs, in one hour, a volume of air having a buoyant power equal to 2702.08 lbs. avoirdupois, or thereby.

§ The air-buoys being at a depth of 65 feet, would be compressed by the water with a force equal to the weight of two atmospheres.

weight of itself. I would also propose the use of such leather buoys for giving expedition to common diving bell operations, in bringing all kinds of goods, cannon, anchors, &c. from the bottom; and also for clearing such rivers as the Tay, below the town of Perth, and many such places, where navigation and the salmon fishing are greatly impeded by large stones at the bottom of the river. The stones might be Lewis'd* at low water, or they might be bored from a diving bell, the collapsed buoys made fast, and at convenience they could be inflated from a boat by a common forcing pump; the stones being suspended in the water may be towed to any place for the purpose of embanking, where they could be instantly sunk by pulling up the end of the escape pipe, B; the more immediate use of which pipe is to allow the superabundance of air to escape, which, while at the bottom of the sea, is compressed by the hydrostatic action of the surrounding medium; but immediately when the envelope begins to ascend with its load, the pressure of the water becomes less, and in the same proportion will the air expand within these bags, and ultimately would burst them, were it not that this pipe allows it to escape. It should be about nine feet long, having its lower end weighed down by a nose of metal, from which the air will always be retained within the bags till its expansive force becomes more than the pressure of water at the under orifice of this escape-pipe. Indeed, the maximum expansive force of air within its envelope may always be known by the length of this pipe B. Such an escape pipe must also be attached to each of the buoys employed in raising the wreck from the bottom of the sea. I shall only remark, that it would not be necessary for these buoys to be absolutely air tight, because they may be kept sufficiently full by the method already pointed out. Nor would there be any chance of their bursting by their buoyant power, which could never exceed the weight of their bulk, and they would require to be just as strong as to be capable of retaining water without bursting when filled with it, and suspended by their hooks from a pin in the wall. I would also propose the use of these buoys for floating the large stones which are used in forming sea-fences or dykes; the stones are usually carted from low water mark, but the method here proposed would be less expensive."

On the Construction of Diving Bells. By S. D. To the Editor of the Mechanics' Magazine and Register of Inventions and Improvements.

Sir,—In the construction of the common diving-bell, an instrument now very extensively and importantly used, a complication of pullies, barrels, and ropes, always liable to accident and interruption, is necessary to insure a supply of pure air to the person in the bell, and to remove the impure air constantly generating. It has struck me sometimes—although from its not having been already adopted, there probably exists some insuperable objection to the proposal, which I do not perceive—that a condensing syringe might be used with great advantage. This syringe might work into a small reservoir above water, from which the communication (a well-constructed hose would serve every purpose) would proceed to the bell; this hose, it is evident, might be of any length, coiled even while in use on the deck of the lighter, which always accompanies the bell, and connecting by means of an opening in the top of the bell, to which might be attached a stop-cock, by which the person inside would always be enabled to govern the supply. For the removal of the impure air, a second set of hose should connect with a second stop-cock; the upper mouth of this set would be in immediate communication with the atmosphere, while the condensing syringe above was supplying the bell with additional air, and thereby expelling from it additional water, the person inside would occasionally, at his discretion, open this second stop-cock, and allow a portion of the impure air to escape, which would be immediately replaced by pure air from the first set of hose, and thus a current of air might be created apparently more perfect, and attended with much less trouble than by the methods in present use. A sketch would more readily explain the simplicity of the mode; but a sketch requires a wood cut, and while doubting whether the idea is not open to some peculiar objection, I have not troubled you with one.

Very respectfully, Sir, S. D.

Boston, April 21, 1834.

Texas—*Brazoria.*—This town is located upon a wooden elevation of peach-land, as it is termed. The spot was chosen as the most commanding and healthful, be sides commanding other advantages. One street stretches along the river Brazos, and one parallel with it further back, while other streets, with trees still standing, are laid out to intersect these at right angles, to be cleared as the wants of the citizens may hereafter require. A speedy settlement is calculated upon with perfect certainty. The first tree was cut in the year 1828, and the town now contains several hundred inhabitants. Such is the increase of population, that some families are obliged to camp out, for want of better accommodations. Mrs. Holley, in her interesting "Letters" from Texas, written two years since, says there is a great want of mechanics, none being there except carpenters. The town is thirty miles from the mouth of the river above mentioned. It contains a good boarding house, the proprietors of which are from New-York. A gentleman, graduated at Yale College, has opened a school, in which the higher branches of education are taught.

Honey Tree.—By these is meant hollow trees, in which the bees deposite their honey. They are very abundant, and honey of an excellent quality, and in any quantity, may be obtained from them. The employment is very profitable. The wax thus obtained is a valuable article of commerce in Mexico. The hunters frequently throw aside the honey, and save only the wax.

Texas is divided into three distinct tracts—the level, the undulating, the mountainous or hilly. The whole coast is level, but free from marsh. A belt of prairie, about ten miles wide, extends along the coast. Back from the prairie the land is heavily timbered with pine, ash, cedar, cypress, and other forest trees. The alluvial bottom lands of the Brazos, San Bernard, and Colorado, are from three to twenty miles wide. They are heavily timbered with various kinds of oaks, cedar, pecan, elm, mulberry, and other forest trees common in the alluvions of the Mississippi.

There is an immense cane-brake, as it is termed, extending along the Cane-brake creek seventy-five miles, and in width is from one to three miles. The Colorado and Brazos rivers, which were swollen by the spring and autumnal freshets, are of a deep red and very turbid. Three thousand pounds of seed cotton and seventy-five bushels of Indian corn are an average crop on the alluvions, which are easily cultivated. One of the branches of the Brazos river is salt, and the land bordering on this river has a fertility (owing to this circumstance) which is truly extraordinary. The alternate deposites of the salt and fresh branches form a soil of a light reddish brown color, impregnated with salt and nitre. The whole valley of the Brazos is what is called mulatto soil, and is the best in Texas. The earth, when brought up to the surface from a depth of twenty feet, will yield as good crops as the surface itself.

Ten miles from the town of Bolivar there is a tree which measures 19 feet in circumference. The country between the rivers and creeks is open, level, rich, and elevated prairie, colored with luxuriant grass, and nothing can surpass these vast natural meadows. Even in the winter season, the pasturage is sufficient to dispense with feeding live stock. On many accounts the prairies are deemed more valuable than the alluvial bottoms for cultivation. The soil of the prairies is a deep black mould, mixed with sand in various proportions.

Of the settlements, besides Brazoria, a town has been laid off at the mouth of the Colorado, called Matagorda, and is destined to become the depot of the Colorado, and of an extensive fertile country.

Above the level region, the country becomes undulating. This kind of land extends in a northerly direction up the Colorado, Brazos, and Guadaloupe rivers, from 150 to 200 miles above the level region, and reaches to the mountain range of Texas. This undulating section is deemed as desirable a residence for man as can be found on the face of the earth. It is bountifully watered, abounding in bold rivulets and springs of the purest water. Successful experiments have been made on these undulations, of wheat, rye, oats, flax, &c. Lime stone and building stone in abundance. Indigenous grapes of various sorts grow in great profusion, and natural vineyards await the hand of the vine dresser.

Lemon Tree.—In the green-house of the late Hon. T. Bigelow, of Medford, there is a lemon tree, which, besides its foliage, its buds, and flowers, has on it about three hundred lemons. These are of course of all sizes, from the smallest to the largest, which are sixteen inches in circumference. The tree is supposed to be about fifty years old. It was given to Mr. Bigelow by the lady of the late Hon. Wm. Gray, about twenty-five years ago. It is emphatically a perennial, being never without foliage, flowers, and fruit. Perhaps some of the credit of rearing and perfecting this splendid exotic may belong to the gardener, whose watchfulness and care have been applied to it during the whole time that it has been in its present place.—[Boston Courier.]

A Curious Horticultural Anecdote.—When Sir Francis Carew had rebuilt his mansion house at Beddington in Surrey, he planted the garden with choice fruit trees. There he was twice visited by Queen Elizabeth; and Sir Hugh Platt, in his Garden of Eden, tells a curious anecdote relating to one of these visits. "I conclude," says he, "with a conceit of that delicate knight, Sir Francis Carew, who, for his better accomplishment of his royal entertainment of our late Queen Elizabeth, led her majesty to a cherry tree, whose fruit he had of purpose kept back from ripening at least one month after all cherries had taken their farewell of England. This secret he performed by straining a tent or cover of canvass over the whole tree, and wetting it now and then with a scoop, as the heat of the weather required; and so by withholding the sun-beams from reflecting upon the berries, they grew both great, and were very long before they had gotten their perfect cherry color; and when he was assured of her majesty's coming, he removed the tent, and a few sunny days brought them to their maturity."—[Platt's Garden of Eden.]

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* A Lewis consists of three bars of iron, which are square on their section, when cut at right angles to their sides; these being placed side by side, form something like a dove-tail tenon; a corresponding mortice is cut in the stone to be raised, and the two outside bars are first placed within this aperture; the centre bar being throughout of equal thickness, is next placed between them, and a bolt with a clutch-ring is passed through the heads of all the three, by which the stones may be suspended. This instrument has long been in use, and is almost indispensable in a massive building.

POTATOES.—I had a quarter of an acre of potatoes growing very flourishingly, and I took a scythe and had them cropped down to the earth. I had another parcel I did not crop at all—and a third cropped long after the blossom showed itself; the result was, that those that were not cropped proved to be the smallest. Those cropped earliest, the largest and best; and those cropped the latest, partially benefitted. This plan of cropping is particularly desirable if you have a long dry season; otherwise, the rapid growth of stalk and leaves will completely exhaust the potatoes that should be forming in the trenches. I have used various other manures, and find all long manures good; but the more salt or its properties you use, the better. The stable manure is particularly good, from the saline matter it contains; what we call woods manure is the most indifferent I ever used; but if it is soaked in salt water, it is greatly improved.—[Farmers' Register.]

THE FIRE OF ADVERSITY.—It was related of the celebrated Dr. Spurzheim, who died in Boston about a year ago, that, in selecting a lady for a wife, he made choice of one who had seen much trouble and had passed through uncommon scenes of calamity. His theory was, that great mental suffering was necessary in the formation of human character, to develope the highest and purest qualities of the soul.

We need not say how well this corresponds with the sacred declaration—"Every son whom he loveth therefore he chasteneth."

It is hard to heave the sigh, to shed the midnight tear, to feel sorrow passing heavily on the naked heart, and such sorrow, too, as we dare not suffer any one but God to look upon; it is hard and bitter, yet, under its chastening influence, it is not for us to say how much the heart beautifies, and the will acquires, the principles of obedience.

Laying aside the considerations of religious improvement, we often see the soul aroused to a strong energy, to the exertion of unwonted power, by the pressure of some kind affliction.

How many deathless works of genius have been forced into being by the iron hand of poverty. Debts, embarrassments, and want, have been the uncongenial, yet creative elements of poetry and romance. The sweetest songs of the swan are fabled to be exported by the agonies of death.

Let the sufferer who struggles under strange and dreadful dispensations—she who mourns a drunken husband—or he who mourns the solace of his heart immured in an untimely grave—reflect, that affliction only darkens this world that it may brighten the next.

COLONY OF PIGEONS.—A Susquehanna Co. Pa. paper mentions that immense numbers of Pigeons have taken possession of, and appropriated to their use, a territory said to be nine miles in length, and two miles in width; every foot of which, and almost every tree and branch of a tree upon it, are constantly occupied by them. It is presumable that the beech woods are indebted for this Pigeon visit to the abundant crop of beech nuts this season.

RAILROAD ACROSS THE ISTHMUS OF PANAMA.—A subscription of $90,800 had been made in Panama for the construction of a railroad from Porto-Bello to Panama, i. e. from the Pacific to the Atlantic. The speedy achievement of the undertaking was considered certain. A gentleman by the name of Ventura Marrouin, has discovered a passage from Cruces to Porto-Bello, i. e. from sea to sea, in a great measure free from hills, which can be accomplished, and which he has actually accomplished, in *less than one day*. The paper before us anticipates immense advantages from this discovery, and says it will be one of the most splendid triumphs which the Isthmus could achieve for commerce and civilization. The authorities of Panama had sent a commission, accompanied by Mr Marrouin, to explore more fully the route referred to.—[Jour. of Com.]

SUGAR REFINERY.—The New Orleans (La.) Advertiser of the 27th May, says—"There are now loading at the Sugar Refinery of Messrs. Forestall & Co. four vessels for the Mediterranean. The Refinery is situated about two miles below the city. One hundred and thirty men are employed in it, and the quantity of sugar refined amounts annually to about 12,000,000 of pounds. The whole process is done by steam, and it is said to be, without exception, the most extensive and complete establishment of the kind in the whole world."

LEAD.—The last Galenian publishes the amount of lead annually made at the lead mines in the United States, from their first opening in 1821 to 1833, inclusive. The statement contains a remark that the lead is less abundant this spring than at any preceding time, and that, comparatively speaking, little will be made this year. The whole quantity made during the twelve years mentioned, is set down at 63,845,740 lbs., of which 7,941,792 lbs. were made during the year 1833. The mining business during that time seems by the table to have fluctuated without any perceptible law of increase. The quantity of lead raised in 1828 was more than twelve millions of pounds, and the next year more than fourteen millions and a half. It fell in 1832 to little more than four millions. This variation arises, we suppose, from the want of a regular plan of operations, a deficiency of capital, and the uncertain tenure by which the lead mine lands are held.

[*From the Cincinnati Mirror.*]

THE FIRST FLAT BOAT ON THE MISSISSIPPI.—A friend called on us a few mornings since to accompany him to the shop of Mr. F. Shields, for the purpose of viewing an iron tablet, recently cast by Hanks & Niles, of this city. It is to be erected to the memory of one of the pioneers of the West, and we should judge that it will perpetuate his name through many ages. It is very spacious, with large and deeply indented letters, and is the first of the kind ever executed west of the Alleghanies.

The following is the inscription:

JACOB YODER,
Was born in Reading, Pennsylvania,
August 11th, 1758.
And was a Soldier in the Revolutionary Army in 1777 and 1778.
He emigrated to the West in 1780, and in May, 1782, from Fort Redstone, on the Monongahela River,
in the
FIRST FLAT BOAT
that ever decended the Mississippi,
He landed at New Orleans with a cargo of produce.
He died April 7, 1832, at his Farm in Spencer County, Kentucky, and lies here interred beneath this tablet.

Capt. Jacob Yoder was a highly respectable and wealthy farmer of Spencer county, Ky. To him belongs the honor of having descended the Mississippi in the first flat boat. And if no other powers than those of time, and wind, and storms shall assail it, this tablet will preserve the fact recorded upon it thro' a long series of coming ages.

No one who has any pretensions to the possession of a soul can contemplate this tablet without a variety of emotions. A brilliant series of associations enchain the mind of the gazer, as with a spell, to it. That the man who navigated the first flat boat that ever descended the Mississippi, should have lived to see a magnificent steamboat ploughing the same watery track, is a truth which affords a subject of much admiration. When he launched his little bark on the Monongahela, what were his anticipations? Such as time has proved? No, he then thought of the wily savage, whose covert was a wide and untrodden wilderness. He proceeded on his precarious voyage. Instead of cheering aspects of busy cities, flourishing villages, and cultivated farms, which now chain the voyager's attention, he saw a range of hills, unshorn of their primeval wilderness, whence the lugubrious howl of the wolf proceeded, the vast wilderness where the foot of civilized man had not trodden, "instinct," 'tis true, "with life," but it was the life of the forest denizen, the trembling fawn, and the myriad songsters of the wild. He reached his destination, but his safety was a marvel to himself, and his dangers, in after-recital, wakened up a fear stricken excitement in the minds of those who listened to his tale of perils "by field and flood." He lived to see the country change masters, the wilderness blossom as the rose, and human energy achieve a conquest over a thousand obstacles. This is the greatest triumph that man has yet achieved. History records no parallel. To the future generations of America, it will be what the fabulous age of the Titans was to the ancient Greeks.

POPULATION OF GREAT BRITAIN.—There has just been printed in two volumes folio, an "Enumeration Abstract" of the population of Great Britain for 1831, made from the returns and answers forwarded from each parish in England and Scotland, pursuant to an act of Parliament.

Population of England and Wales, from the year 1700 to the year 1830, including the army and navy, and merchant seamen.

1700—5,134,516	1750—6,039,648	1800—9,187,176	
1710—5,066,337	1770—7,227,586	1810—10,407,556	
1720—5,345,351	1780—7,814,227	1820—11,957,565	
1730—5,687,993	1790—8,540,738	1830—13,840,851	
1740—5,829,765			

The population of Ireland amounted to 7,767,401.

The increase of Great Britain since 1801, has always been about one and a half per cent. per annum.

The comparative proportion of families stands as follows in centesimal parts.

	Agriculture.	Trade, &c.	Others.	Total.
G. Britain	1811—35	44	21	100
	1821—33	46	31	100
	1831—28	42	30	100

Thus trade and manufactures appear to have somewhat increased between 1811 and 1821, agriculture to have somewhat declined; but between 1821 and 1831, the proportion of families employed in trade receded from 46 to 42 per cent. and the agricultural population from 33 to 28 per cent.

Summary of Great Britain.

	1801	1811	1821	1831
England,	8,331,434	9,551,888	11,261,437	13,191,005
Wales,	541,546	611,788	717,438	806,182
Scotland,	1,599,061	1,805,588	2,093,456	2,365,114
Army, Navy,	470,598	640,530	319,300	277,017
	10,942,646	12,609,864	14,391,631	16,539,318

LIEUT. DRUMMOND'S ARTIFICIAL LIGHTS. *National Gallery of Practical Science.*—There was on Wednesday evening literally a most brilliant exhibition of Lieut. Drummond's intense lights, applicable to light-houses, telegraphic signals, geodætical operations, and all purposes which require such light to be visible at great distances. Many hundreds of the most distinguished patrons of science and eminent practical scientific men were present on this interesting occasion; and the series of experiments were conducted with extraordinary effect; Mr. Payne, the manager of the gallery, having made all the previous arrangements which were requisite with great skill and judgment.

About two years ago we gave an account of Lieut. Drummond's method of producing this powerful glare of light, by the action of oxygen and hydrogen gas in a state of combustion on a ball of lime. We now saw an Argand lamp, with parabolic reflectors of such prodigious splendor, that, as it revolved, it has been visible forty-four miles off; but even this was incomparably excelled by one of the new combinations, so dazzling that no eye could bear to gaze upon it in the line of reflection; and it was stated to be visible at the distance of sixty-six miles!! The next experiment was, we rather think, made for the first time in public, and consisted of the emission of the electric spark, with a parabolic reflector, and so rapidly continued as to form a perfectly continuous light. This was beautiful; and a magneto-electric light, demonstrating the efficacy of galvanism in producing intensity, was not less so. Colored lights were also exhibited; and, altogether, a more gratifying display of admirable and useful science never came under our cognizance. The noble gallery was crowded; and every visiter expressed delight and astonishment at the splendid varieties presented to their view.—[London Paper.]

CROCODILE BIRD.—*Translated from Herodotus.*—"Now as the crocodile lives much in the water, he has his mouth within quite covered with leeches. All other birds and beasts shun the crocodile; but there is peace between him and the trochilus, inasmuch as he is benefitted by that bird; for when the crocodile goes out from the water upon the land and opens his jaws, which he is wont to do, in order to receive the cool breeze, the trochilus then entering his mouth, devours the leeches; and he, delighted at the advantage he thus receives, never injures the trochilus."

DROMEDARIES.—The French are, it is stated, endeavoring to introduce dromedaries from Algiers into the *Landes* about Toulouse, where it is thought they may be very usefully employed.

Interesting and Useful Items.—We have so much *disinterested* regard for our readers, and so strong a desire to please them, that we mark down for insertion in the Farmer, every thing that we read, and every thought that enters our mind, which we consider calculated to benefit or afford them pleasure. We are sure that if all their friends take as much pains to increase their rational enjoyments, they cannot fail of being unusually happy.

Most of the following items were picked out of Turner's Sacred History of the World, republished by the Messrs Harpers of this city.

Silex in Vegetable Substances.—"The cuticle of grapes contains a large proportion of silex. Wheat straw may be melted into a colorless glass with the blowpipe, without any addition. Barley straw melts into a glass of a topaz-yellow color. The bamboo secretes the tabasheer, which consists of silica with a minute quantity of lime and vegetable matter."—[Lindsey's Nat. Syst. Bot. p. 301.] "The equisetum makes a natural file, and even brass cannot resist its action."—[Smith's Introd. Bot. p. 76.] "The ashes of this tribe contain half their weight of silica. It is so abundant in the equis. hiem. that after Mr. Siveright removed the vegetable matter it yet retained the form."—[Lind. p. 311.]

Wheat in Otaheite.—Wheat, so fertile and familiar to us, will not grow in Otaheite, or in any of the Polynesian islands. It has been often tried, but has always failed.—[Ellis. Polyn. Res. vol. 1., p. 348.] *Egyptian* wheat was planted, but with the same result. It grew remarkably well, the leaf green, the stalks high and strong, and the ears large; but as they begin to turn yellow, it appeared that scarcely one contained a single grain of corn, and the few found were shrivelled and dry.—[Ib. 444.]

Benevolence.—All that concerns human beings has been made upon a principle of benevolence. The same principle continues the system and superintends the working, and will always adapt the provision to the necessity, and supply further assistance if new exigencies should require it. But nothing supernatural on this point is likely to be wanted. Cultivated produce has hitherto outrun population in every country, and there is every appearance that it will always do so.

I infer this from observing from the publications and complaints on the Continent—of most countries—in 1830, stating that they had more produce than they could sell, and censuring the corn laws of other countries that repress importation. This occurred at a period when the same countries were, by their statistical tables, all increasing in their own population. Yet still in all the produce was more than they consumed, and they sought to export for the chance of better prices than their home ones, from those places where, from other causes, these were higher than their own.

Thus Humboldt found the natural produce of wheat in different countries, with all the carelessness of their indifferent cultivation, to be: in Germany and Poland, 5 or 6 for one; in Hungary, 8 or 10; in La Plata, 12; in North Mexico, 16; in the equinoctial Mexico, 24; in New Granada, 25, and in fertile years, 35. So in Greece it is 12 for one, and on the best soils even 15 or 18.—[Encyc. Brit. Suppl. p. 508, 571.]

Of Cape wheat 50 grains produced 4,074, or 80 for one; and in Barbary wheat 225 grains, sown in March, yielded in August 11,500 or 50 for one.

In Barley, one sort, (called naked,) gave 56; the Siberian, 111; the celeste, 120; the hexastichon, 130 for one; and the Philadelphian oats, 140 for one.—[Bull. Univ. 1829, p. 111.]

Heshbon wheat, a new kind lately brought from Arabia, has ears twice as large as the common kind, with 84 grains in one ear.—[Cambridge Journ. Aug. 1829.]

Le sarrasin de Tartarie, brought by a missionary from Siberia, gives for one grain sown, up to the number of 2000 grains in *good* lands. Elsewhere, it bears from 50 to 300. It produces a better meal and can be kept as well as corn—[Bull. Univ. 1827, p. 166.] Dandini mentions the clusters of the vines of Lebanon to be enormous, and the grapes themselves as large as cherries.

In Hungary, the vegetation is peculiarly vigorous. Csaplovic has recently stated as instances of it which have occurred, that 6 or 8 Hungary plums weigh one pound; as 18 cherries were seen to do in Yemen. In Beregh, apples have been of one pound and a half; and firs attain there a height of 216 feet, and a diameter of more than 6; oaks 114 feet, with a similar diameter; maples, 85 feet high, and 34 round.—[Bull. Univ. 1830, p. 444.]

In some part of South America the bamboo attains a gigantic size, and the passion flower assumes the character of a large tree. How the Indian banyan or fig tree multiplies itself by its descending branches into arches and groves of new ones, as they take root in the earth, is well known. One tree has covered an area of 1700 yards.

The marine plants of Staten Land are described by Captain Webster as gigantic. And in Sumatra the rafflesia parasite bears a flower which is a yard in diameter. The same island has a tuberculous and alimentary root, that weighs 400 pounds; and melons and gourds half as big. There the chama gigas appears, a shellfish called the Dutchman's cockle, one of which would sup twenty-four hungry persons.—[Quart. Rev. No. 67, p. 522.]

"Some of the reeds of Brazil, called gaquarussa, grow from 30 to 40 feet high, with a diameter of six inches. They form impenetrable thickets, and are grateful to hunters; for on cutting off such a reed below the joint, the stem of the younger shoots is found full of cool pleasant liquid, which immediately quenches the most burning thirst."—[Lindsey, Nat. Bot. 303.]

"The best fodder grasses of Europe do not rise more than three or four feet from the ground; but the panicum spectabile of Brazil grows six or seven feet high; while other equally gigantic species constitute the field crops on the banks of the Amazons."—[Linds. Ib. 304.]

I allude to the instances of unusual produce which happen in some parts every year, and which I have noted from the daily papers: as,

Outs.—An oat stalk taken from a field on Sealand, near Chester, had 237 grains. Another, on a field lately part of Cockermouth Common, had 251. A wild oat at Milton was 10 feet high, and had 150 grains. One ear of black oats at Mansfield was 15 inches long, and contained 283. In 1824, a single grain of oats having fallen on a quantity of burnt clay, produced 19 stems, and 2,945 grains.

Wheat.—A single grain of Talavera wheat sown in a garden at Weston, near Bath, in September, 1819, had in August afterward produced 73 stalks, and yielded 7445 grains. One of the greatest increase of *wheat* that I have met with is that mentioned in the Philosophical Transactions. Mr. Millar, by repeated divisions, obtained from a *single seed* of wheat 500 plants, which yielded 21,109 ears, and about 576,840 grains, weighing 47 pounds, all the produce of one single corn.—[Phil. Tr. 1768, vol. lviii, p. 203. Thomson's Hist. Roy. Society, p. 68.]

Peas.—A dwarf pea sown near Stockton produced 88 pods, containing 386 peas. Another pea, sown at Cawood, had 105 pods, out of which 505 peas were taken.

A Peach tree in Laleham Garden produced in one year 1560 fine peaches, besides a great number thinned away in the early part of the season.

A white moss rose-tree near Ripon had 520 in flower, and 460 buds beginning to open. And a small rose-tree near Congleton had 2344 roses and buds. A common scarlet bean has produced 100 pods with five full-formed beans in each, making in such stalks from 300 to 500 from the single one sown.

Seeds.—The two stamina of the orchides fecundate 8000 seeds—and the five of the tobacco 900.—[Loud. Encyc. 226.] The quantity of small seeds from garden flowers is well known. But Mr. Hobson found that a thriving plant of the common malva sylvatica yielded in one summer 200,000 seeds.—[Phil. Trans. 1743, vol. xlii. p. 20.] It has been computed that if all the successive seeds of a single fern, of one peculiar sort, were to germinate without obstacle, this species would in twenty years cover *the whole globe.*—[Bull. Univ. 1829, p. 438.]

Bread from Straw.—Sawdust may be converted into a substance like bread. It is less palatable than flour, yet makes a wholesome bread, digestible and highly nutritive.—[Dr. Prout's Account of Prof. Autenricht's Experiments, in Phil. Trans, 1827, p. 381. Hersch. 65.]

"Chance led a miller in the Cote d'Or, to discover the means of converting straw into a farine of pretty good quality. Lately the Duc d'Angouleme, passing through Dijon, tasted some small loaves made of it, and took some to show the king. It was M. Maitre, founder of the agricultural establishment of Viloffe, near Chatillon, who first discovered it. He has since found that not only the straw of corn and other grains may be made into flour, but that hay, and the stalks of trefoil, lucerne, and sainfoin, are also convertible. Flour from these last he gives to his sheep and lambs."—[Bull. Univ. June, 1830, p. 157.]

The Moniteur, in May, 1830, mentioning that wheat straw, chopped and ground, yields a flour that was coarse, but agreeable and nutritious, added, that its bread was *superior* to the *common* bread used by the lower orders on the Continent.

The public papers of March, 1830, stated that Mr. Gouldson had discovered a mode of separating and preparing the farinaceous parts of such bulbous roots as turnips, carrots, parsnips, beets, &c., and of converting it into a fine flour. After two years' experiment, he has now obtained a patent. He declares that he really produces good and nutritious bread, equal, both in quality and color, to the finest white wheaten bread. The quantity of farina to be obtained from the roots grown upon any given quantity of ground, compared to that produced from the ears of wheat on the same space, is increased, he says, at least twenty times.

Products of France and England.—The yearly produce of France, in 1828, on an average of 4 years, was 21 millions of quarters of wheat, 32 millions of other grain, and 16 of chesnuts and potatoes. These, at moderate English prices, would be 140 millions of pounds sterling for this part of their produce.

It would not be less in England. In a well written Scotch periodical in 1827, the *annual* value of all the grain grown in Britain was computed to be 112,000,000*l.* sterling; and its cattle, sheep, hides, wool, butter, cheese, and poultry, at 108,000,000*l.* more, mostly the produce of the year. This would make above 200 millions of pounds sterling for the annual gift of Providential Nature to us in these productions.

This calculation is not immoderate; for, taking our consumption of wheat in a full year at 20 millions of quarters, this at 60 shillings a quarter would be 60,000,000*l.* But if our barley, oats, beans, peas, rye, and other grain, and potatoes, bore the same proportion as in France, these would amount to as much more, and make the annual value of our produced corn and grain 120 millions of pounds sterling. The wool from our sheep's backs was in one year 111,160,560 pounds weight, which at eighteen pence a pound comes to 8,337,041*l.* Our sheep are estimated by M. Moreau, at 42,000,000; our cattle at 10,000,000; and our horses at 1,800,000; and a large proportion of these, or of their value, is the growth of a single year. Indeed, all our wool, milk, and flesh, are our

grass and corn converted into these substances by the assimilating process of the animal body. To this yearly benefaction, if we add the pecuniary value of a year's growth in all countries, of other growing produce, we shall feel, in some degree, how much every nation is annually receiving from the vegetable system established at creation. Few cultivate their soil as they ought—but with all their indolence or ignorance still enough is raised from it all over the world to sustain a population of 800 or 1,000 millions, who are now living on the globe. Now, if each inhabitant of it, on an average, required only the value of 10*l.* produce for his yearly support, the earth is, on this calculation, yielding annually to the human race, from its vegetable system, either 8,000,000,000*l.*, or ten thousand millions of pounds sterling, in the feeding articles only—and this with a constancy that never fails in its general sufficiency.

Our obligations to this vegetable system, and its essentiality to the plan and maintenance of our creation and subsisting course of things, will not be lessened if we reflect that the whole animal world, except the fish, are but conversions of the vegetable world into their bodily substance. Prodigious, real, daily, and yet inscrutable and incomprehensible transformation! effected and effectible only by the will, ordinances, and power, of the OMNIPOTENT MAGICIAN; acting steadily with continuing kindness by the magic of his invented organizations—and with the instrumentality of the principle of life in its two great classes—in the vegetable kingdom, to change inorganic matter into a fitness to serve for animal nutrition—and in the animal genera of being, to convert the food thus organized by plants into their own flesh, or into the flesh of other animals, which they afterward assimilate to their own.

RURAL DELIGHTS.—Anacreon sweetly sings his delight from vegetable nature—and most enthusiastically of the rose—though he also twines the lily and the hyacinth round his forehead, as an attractive and festive ornament. Their presence, and the scenery and companions which always surround them, have excited in many poets, of all nations, their finest thoughts and feelings,—as in one of the delicious passages of Milton, which has never been excelled:

"Sweet is the breath of morn: her rising sweet,
With charm of earliest birds: pleasant the sun,
When first on this delightful land he spreads
His orient beams, on herb, tree, fruit, and flower,
Glist'ning with dew: fragrant the fertile earth
After soft show'rs: and sweet the coming on
Of grateful evening mild: Then, silent night,
With this her solemn bird; and this fair moon,
And these the gems of heav'n, her starry train
But neither breath of morn, when she ascends
With charm of earliest birds; nor rising sun
On this delightful land; nor herb, fruit, flower,
Glist'ning with dew; nor fragrance after showers;
Nor grateful evening mild; nor walk by moon,
Or glittering starlight, without Thee, is sweet."
[Parad. Lost, B. 4.]

POLLEN IN THE AIR.—The grains of pollen often fill the air. Treviranus saw ponds covered with the pollen of the wild pine, from a wood half a league off. So, M. Kaulfuss adds, may the moss grains float to a part where there were no vegetables before. We every day see how rapidly a new wall or roof is covered with the gymnostomium ovatum, and grimmia lanceolata.—[Bull. Univ. 1829, p. 438.]

POTATOES.—Potatoes planted at one foot deep produced shoots at the end of the spring; at two feet, not till the middle of the summer; at three feet, their roots were very short, and did not come to the surface; below three feet, they never vegetated. Several were buried in a garden at 3½ feet, and after two years were found without any germination, but with their original freshness, firmness, and proper taste.—[Ann. Soc. Agr. Fr. 1829.]

VEGETABLE FOOD FROM A GIVEN SPACE.—Humboldt calculates that 1000 square feet of banana plants will produce 4000 lbs. of nutritive fruit; while the same space would only grow 33 lbs. of wheat and 99 lbs. of potatoes.

Some seeds increase in their power of vegetation by passing through birds. The seeds of the magnolia from America would not grow here; but those eaten by turkeys never failed. [Dr. Walker] Hence the dung of domestic animals often fills a garden with many weeds. —[Ibid.]

THISTLE.—Two kinds of this plant, the milk and cotton thistle, were formerly boiled and eaten as artichokes now; its leaves as salad and greens. Its young stalks, peeled and soaked, are said to be excellent.—[Loudon Enc. 736.]..... Useful things have been manufactured from thistles. Goats and donkeys eat them, and in preference to other food sometimes. In Germany, after being beaten, they are given to the horses, who eat them greedily. The German cavalry have been often brought into good condition by them.

PERIODS OF GERMINATION.—Adamson has given this table of the periods in which the following seeds germinate after being sown:

Wheat, millet, . .	1 day
Spinach, beans, mustard,	3 "
Lettuce, aniseed, . .	4 "
Melon, cucumber, cress,	5 "
Radish, beetroot, . .	6 "
Barley	7 "
Purslain	9 "
Cabbage	10 "
Hyssop	30 "
Parsley . . 40 or	50 "
Almond, chestnut, peach,	1 year
Rose, hawthorn, filbert.	2 "

By steeping the seed in the chlorine gas, the process was hastened: cress-seed then began its germination in 32 hours. Achard found that they would not grow in heterogeneous hydrogen gas.—[Loud. Enc. 195.]

LAPLAND VEGETATION. — A Lapland and Siberian yew exhibits remarkably rapid vegetation, beginning and fruiting in a single month; thus—

July 1—Snow gone.
9—Fields quite green.
17—Plants at full growth.
25—Ditto in flower.
Aug. 2—Fruit ripe.
18—Snow.

And from that time snow and ice to the 23d of June, when they begin to melt.

VEGETATING PRINCIPLE.—At the Royal Institution in 1830, Mr. Houlton produced a bulbous root, which had been discovered in the hand of an Egyptian mummy, where it had remained above two thousand years. On exposure to the atmosphere it germinated, and when planted in earth it grew with great rapidity.—[Jour. Roy. Instit. No. 1.]

Thus sensitive plants lose their power of contracting, if laurel-water, opium, or nux vomica be applied. So they contract from camphor, and do not dilate again.—[Quart. Journ. Science, vol. ix. p. 203.]

LEAVES TURN TO THE LIGHT.—Bonnet placed some plants in a heated stove; yet the stems did not incline to the side of the greatest heat, but to a small opening of the stove, from which some rays from the burning fluid issued..... Sir J. Smith, in his lectures, stated, "It is an invariable circumstance, that plants always turn their stem and leaves to the light, not towards the air. If in a hothouse, the door of which is left open, we shall yet always find them inclining to that side where the light is, let the air come in whence it may."

VEGETABLE GEOGRAPHY. — The result of Humboldt's inquiries as to the geographical distribution of the monocotyledons implies this fact; for he reckons that they form one-sixth of the flowering plants in the equinoctial regions; one-fourth of those in the temperate zone; and nearly one-third towards the polar circle. Thus they are in all climates, but in different proportions in each.

ANTEDILUVIAN BOTANY.—"The number of species considered as lost is diminishing every day; while those of the fossil kind which are analogous to our existing races are continually augmenting, in proportion as we better know the various productions of distant countries, and even of our own region." The great and marking difference seems rather to be, the enormous size to which what are common plants with us the antediluvian ones appear to have reached. It is in their superior magnitude to ours that they present to us a state of botanical nature so far different from them; not in configuration, organization, or essential economy. Kindred likenesses, though not identity, are still the accompanying features.

"The weed stramonium is in a great part of the western country. On the richest bottoms it grows fifteen feet in height, and of a size and compactness to turn away cattle."—[N. Amer. Rev. No. 62, p. 92.]..... Wilson, in his Ornithology, describes the *mosses* on the leafless limbs of the cypresses as being from two to ten feet long, and hanging down in such quantities that fifty men might conceal themselves in one tree.

FISH HATCHED UNDER FOWLS.—The Chinese have taken a fancy to hatch fish under fowls. For this purpose they collect from rivers and ponds the gelatinous matter which contains the eggs of fish, put it into vessels, and sell it to the proprietors of ponds. When the hatching season arrives, a fowl's egg is emptied of its usual contents, and this gelatinous matter is put in. The entrance is hermetically sealed, and it is put under a hen. After some days the egg is opened, and placed in a vessel of water heated by the sun. This is kept in his rays until the little fish become strong enough to bear the external temperature.—[Bull. Univ. 1829, p. 82.]

A YOUNG SEAL.—A farmer of Aberdeen brought home a young seal, and fed it for three days with bread and milk. His wife disliking its presence, it was taken out of the town by the man and some friends, and thrown into the sea; but it returned to them, notwithstanding every endeavor to repel it. The tallest then walked into the sea as far as he safely could, and threw it into the waves, while they hid themselves behind a rock; but the animal again advanced to land, and found them out in their hiding-place, and remained with them, till the farmer took it back once more to his house.—[Bingl. p. 100.]

THE ARTS TAUGHT BY ANIMALS. — The argonauta class is immortalized by the admiration of antiquity, and by its belief that it taught mankind the use of sails; which Pope has so pleasingly alluded to in his most valuable poem, the noblest specimen of didactic poetry which mankind in any language yet possess:

The arts of building from the bee receive;
Learn of the mole to plough; the worm to weave;
Learn of the little NAUTILUS to sail,
Spread the thin oar, and catch the driving gale.
[Essay on Man, Ep. 3.]

BIRDS.—There is great truth in the following sentiments: "The main province, the very paradise of nature, is THE BIRDS. The gracefulness of their forms; the exquisite delicacy of their covering; the inimitable brilliancy of their colors; the light and life giving transparency of the element in which they live; the singular variety of their habits; the delightful melody of their songs; and the remarkable fact, that with organs apparently more unfitted for articulation than many quadrupeds, they are the only animals that can imitate man in the wonders of voice, and rival him in the intricacy of music. .... These qualities make the study of birds the favorite study of every elegant mind."—[Jerdan's Lit. Gaz. No. 672, p. 790.]

NUMBER OF QUADRUPEDS.—The number of quadrupeds at all times on the earth is, as of

the other kinds of animals, marvellously great, and exceeds the possibilities of human observation or enumeration. Of the eight hundred or thousand individual species which are now simultaneously existing, many are very prolific; but in those which we domesticate, and which moderately multiply, the quantity is very large.

To instance only in the SHEEP: France feeds 34 millions of sheep; and Great Britain and Ireland, 44 millions; Prussia, in 1825, had nearly 12 millions; Austria, in 1815, nearly 11 millions; and Hungary 8 millions; Spain, in 1803, had 12 millions; the Confederated Provinces of Germany, in 1820, had 20 millions. [Bull. Univ. 1827, p. 98; 1830, p. 303, 385.] Thus these seven countries of Europe possess 141 millions of these animals only.

ANIMAL HARMONY.—At New-Hargard, in Germany, the landlord placed on the floor a large dish of soup, and then gave a loud whistle: immediately a mastiff, an Angora cat, an old raven, and a large rat with a bell, entered the room. All four went to the dish and fed together.

BLUMENBACH'S APE, which he kept above a year, would manage the wood for his stove, and put it in with as much judgment and economy as a cookmaid. He was often at the college, and used to examine the pupils' specimens with amusing imitation and grimace. One day he found a work on insects on the table, which he studied with great gravity; but a person entering the room an hour afterwards, found that the ape had with great dexterity pinched out all the beetles of the large plates, and eaten them, mistaking the pictures for real insects. This was an unlucky, but not a foolish action.

AN EDUCATED SOW.—A black sow was taught to find game, and to back and stand nearly as well as a pointer. When very young she became attached to some pointer puppies, and the keeper resolved to try her. He gave her some pudding of barley-meal as her reward, and threw stones at her when she did wrong. By this mode he soon taught her what he wished. As soon as the game she pointed rose, she always returned to him for her reward.—[Bing. An. Biog. vol. ii, p. 184.]

LAND FROG.—Catesby states that the land frog which inhabits Virginia and Carolina prefers those insects which shine in the dark. On a warm evening, a person in his company let fall some burning tobacco from his pipe, which was instantly swallowed by a land frog squatting close by. "Catesby offered it a little bit of lighted charcoal, which it swallowed immediately. He found, on repeated trials, that the land frog constantly swallowed whatever burning substances came within its reach."—[La Cep.]

VENOMOUS ANIMALS.—It is a curious distinction of these animals, which has been lately made, that all the species of serpents of which the young are hatched within the mother, and which are therefore born alive, are venomous. This seems to be more certain than the converse of the rule, that all oviparous serpents are not injurious.

INSECTS.—"All genuine insects have six legs; a head distinct from their body, furnished with two antennæ; and pores for respiration, conducting to tracheæ, arranged along their sides. They are all produced from eggs. Some undergo no metamorphosis; others but a partial change; whilst the remainder pass through three stages of existence, after their egg state."

THE GAD-FLY.—The gad-fly so places her eggs, which are to be nourished in the entrails of animals, as to be on the spot from which their tongue will absorb them and convey them into its stomach.

"She places her eggs on those parts of the skin only which the horse is able to reach with his tongue; nay, she confines them almost exclusively to the knee or shoulder, which he is sure to lick!" [Kirb. 341.] The larva is vivified from the egg within him, and having ceased feeding, are passed from his body. Mr. Clark thinks that the good which our cattle derive from them is, that they act as useful stimuli or blisters.—[Ib. 148.]

LARVA OF INSECTS IN THE AIR.—The larva of some insects float in the air, and are wafted by the wind. In October 1827, near Moscow, snow fell in a N. W. wind; and with it a considerable quantity of blackish larvæ veloutes. M. Maneff gathered several. In a vessel of snow they lived some time; and in cold water; but those put in a warm place, soon perished.... Mr. Fisher thinks that they are taken up from the earth in violent winds.... Others of this kind fell near Zverrigorod, and in the winter of 1826 at Archanglsky; others on a mountain near Moscow.

A similar phenomenon was remarked in November 1672, and in 1745, in Hungary. In 1749, "the ice of a lake near Sædermanland was covered with a great quantity of the same larvæ, which had been brought from the forests of Westermanland, where the wind had torn up several trees." [Bull. Un. 1829, p. 310].... So Dr. Hempush, sailing from Trieste down the Adriatic, found their ship covered with insects brought by the wind.—[Bull. Univ. 1830, p. 53.]

VARIEGATED PLANTS.—Sir: Your correspondent Mr. Rutger wishes for information as to variegated plants: how variegations are produced, and their uses, if any, in ornamental scenery. Being far from partial to such plants, I am ill qualified to comply with his wishes; but, with your permission, will do my best. The origin of variegation has, doubtless, been in some caprice of nature. Many persons attribute it to disease; in which opinion I am inclined to concur. I have never heard of any authenticated plan by which variegated seedlings could be insured, nor which could induce a self-colored plant to bear variegated leaves. Grafting or budding is the only means with which I am acquainted for perpetuating or multiplying variegation, except in the case of a variegated species; as, for instance, Aucuba japonica. Next, as to the use of variegations in ornamental scenery, I consider it very limited. When introduced into landscapes, on a large scale, they tend to destroy all repose, and to fritter away effect. The situation to which I think them best suited is the verge of a shrubbery flower-garden, where, if judiciously placed, they may harmonise with the gay tints of the flowers, and connect them with the more sombre hues of the surrounding shrubs. Variegated evergreens are useful in a winter garden, serving, in some measure, to compensate the eye for the deficiency of flowers during winter; and in small groups of shrubs on a lawn, they might, if placed with judgment, be an acquisition. Most nursery catalogues furnish the names of approved variegated shrubs; but by far the handsomest, in my opinion, is the golden-edged holly. I saw, at the Clapton Nursery, while conducted by Mr. Mackay, variegated sycamores, and a numerous assortment of variegated shrubs. I believe Mr. Mackay paid much attention to them; but, not having been lately at Clapton, I do not know whether Mr. Low keeps up the collection. I am, Sir, yours, &c. CALYCANTHUS. Hastings, Feb. 1834.

Our correspondent has evidently a painter's eye, and we invite him to become a contributor on the subject of landscape gardening: a department of the art which it is one of the great objects of this Magazine to render familiar to the young gardener. We are convinced that there is no other mode of increasing the picturesque beauty of country residences, in conjunction with their gardenesque improvement, than that of diffusing a taste for picturesque beauty, and a knowledge of the means of producing it among practical gardeners. The time for employing landscape gardeners at high prices is, in a great measure, gone by; as is also that of employing high-priced architects. A taste for the beautiful in nature and art is spreading widely among practical men and the middle classes of society; and we trust that in another generation these two classes will act reciprocally upon each other, so as to create a demand for beauty of every kind, and more especially in landscape gardening and architecture everywhere; and to produce a supply among particular gardeners, builders, carpenters, and masons, as extensive as the demand. To accelerate this important result is the great object of the Gardener's Magazine, and also that of the Magazine of Architecture.—[Loudon.]

[*From the Knickerbocker.*]

SUMMER.

There is a calm, sweet spirit breathing here
About these summer scenes—of earth and sky.
The earth is beautiful in her attire
Of verdant green, and incense-breathing flowers.
Her mountain summits peering to the stars,
Her quiet valleys, slumbering in shade—
Her rivers of pure crystal;—and the songs,
With which her groves are vocal, melt away
Into the music of the rolling spheres.

Is it the attitude and voice of praise
She lifts to her Creator? On the hills,
And in the valleys, and among the groves,
Is nature worshipping with all her tongues,
The unseen Spirit of the universe?
It must be so. And ye, far, silent stars,
Sweet sentinels on the outposts of time,
Keep ye her vigils? Are ye posted there,
Her ministering spirits, to bear up
On wings of light the tribute of her praise,
And bring down Heaven's rich blessings in return?

Beautiful universe! spread out afar
Beyond the reach of thought, on every side,
Bearing where'er the soul would take its flight,
The impress of His beauty and His power
Who called you into being, and affixed
The seal of his own glory on your brow!
I've gazed upon you till this world became
A very point—and still, far, far beyond,
Before the imagination, brightly rose
Creation on Creation.

What is man,
I asked, with all his powers? Creation's lord
They call him—and he treads the flowering fields
And climbs the hills, and in the quiet vales,
Bends him to listen to the music there—
Brushes, at dawn, the dewy copse, and bathes
His fevered brow, at noon, in the cool fount;
Looks out at evening on the coronet
Of gems that binds the azure brow of Heaven—
And sleeps, at morning, in a nameless grave!
Or, numbering out his most extended span,
And left, amid the wreck of all beloved,
Save hope that lights him on—Affection's chain
So fondly bound about his heart in youth,
Severed in broken links—his summer gone,
His gray hairs come, in sorrow, down to death!

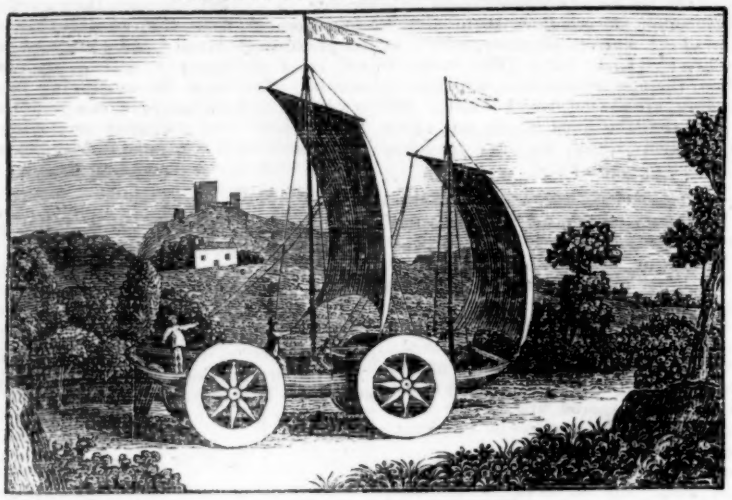
This glorious universe of earth and sky,
And suns and systems, pass from change to change,
With beauty unimpaired—but *he* is gone!
The frailest of her flowers outlives him oft.
Nature's rich bosom swells with silent joy,
The stars shine on in peace—the sun on wings
Of dimless glory keeps his joyous way—
And all is happy—*but this lord of all!*
No wonder that he pauses and repents—
"Oh what a mystery to man—is man!"

But lo! a voice speaks out—a vision comes—
And with it other worlds, another home—
A higher service, and a nobler song!
The scene is changed: this bright and teeming earth,
All redolent of life, from age to age,
Follows the track of time—till, worn and old,
The long, long record of its centuries lost,
It sinks forever; and the sun and stars
Are blotted out of being. But afar,
Fresh as the blush of spring in glowing youth,
The immortal spirit gazes on the wreck
Of all that seemed eternal—*but itself!*

Is such the glorious destiny of man,
The image of his Maker? When the storms
Of his brief night of trial shall be o'er,
Opens before him an eternal day?
Does he thus melt, like a sweet star, that o'er
The mountain trembles, at the dawn of day,
Softly away into the light of Heaven?
Let God be praised—and to his unsurpassed
And boundless goodness be the glory given!

DELTA.

STEPHINUS' SAILING CHARIOT.



THE SAILING CHARIOT.—It would be almost as difficult to assign limits to human ingenuity and invention, as to human ambition. That there are limits which the one cannot pass, while the other is boundless as the imagination itself, will not be denied; but the scientific discoveries of the last half century must make us hesitate before we say such or such a thing is impossible. In mechanics, in chemistry, and in the ingenious branches of the fine arts, improvements and discoveries have succeeded each other with a rapidity which outstretched all anticipation, and have set all calculations at defiance. No man will now dare say to any of these branches of science, "hitherto shalt thou go and no farther."

To be enabled to make the wind, which "bloweth where it listeth," subservient to the purpose of propelling huge vessels on the ocean, and thus to form an intercourse with the most distant parts of the world, was a great triumph of science; but to be able to steer a vessel with a rapidity that the wind does not generally afford, in a dead calm, or independent, or even against the wind, by steam, is a discovery which would not have been credited a century ago; and other discoveries which were once thought equally improbable have since been made.

The wind, which has been of such good service on the ocean, has for ages been used in machinery on shore, such as the working of mills, &c. Some individuals have, however, thought it might be used to propel vehicles on land. In the last century, Stephinus, of Scheveling, in Holland, constructed a chariot on wheels, to be impelled by the wind, the velocity of which was so great that it would carry eight or ten persons from Scheveling to Putten, a distance of forty-two English miles, in two hours.

Carriages of this kind are said to be frequent in China; and in any wide level country must be sometimes both pleasant and profitable. The great inconvenience attending the machine is, that it can only go in the direction the wind blows, and even not then, unless it blows strong; so that after you have got some way on your journey, if the wind should fail or change, you must either proceed on foot or stand still.

The Hollanders have small vessels, somewhat of this description, which carry one or two persons on the ice, having a sledge at bottom instead of wheels; and being made in the form of a boat, if the ice break the passengers are secured from drowning.

Our engraving presents a perspective view of Stephinus' Sailing Chariot. The body of it is in the form of a boat; the axletrees are longer, and the wheels further asunder, than in ordinary carriages, in order to prevent its being overturned. The body is driven before the wind by the sails, guided by a rudder.—[London Mirror.]

NORFOLK HOGS.—From two letters of Mr. W. K. Townsend, of New-Haven, to the editor of the Baltimore Farmer, we extract the following.

Dear Sir:—Your much esteemed favor of the 24th ult. came to hand some days since, and should have received an earlier answer. I have a breed of swine, (Norfolk Thin Rind breed,) which are in these parts considered rather before any other breed we have. They were imported something over four years since, by Henry Degroot, Esq. of New-York. He was in England, and heard of this breed of hogs as being of much note in that country. He purchased three pigs, and on his return took them to his farm in New-Jersey, where he had a superior stock of blood horses and short horned cattle. Immediately after his return, he concluded to go to England, and spend some years in the city of London, and offered me his stock. I purchased two cows, one bull, and two pigs, (one boar and a sow)—the other, a sow, he placed on his father's farm. I have since understood that it has changed the breed for the better, in all that neighborhood. Persons in this part of the country have given them a thorough trial with other breeds; and they, with the same feed, have done better than any other. I usually keep, say five or six breeding sows; and my pigs are usually all engaged before they come. I generally choose a few of the best, and sell them for breeding, at different prices, at different ages: when well weaned from the sow, five or six dollars each; and as they advance in age, so I advance in price.

The black and white is quite liked in this section of the country; some prefer white. I did not know which (if either) you would prefer, so I send you a part of each. My old imported sow was white; the boar black and white, marked almost like them sent to you. This breed of hogs is not particular as to feed; my sows run in pasture, and get most of their living on grass, until nearly time to pig. While they nurse, I feed them on meal, beans, rye, boiled potatoes, and some corn. I am told almost daily, by persons who have pigs from me, or of others that have got into the breed, that their pigs do much better on the same feed than any other they have had.

HOVEN IN CATTLE.—A correspondent says that he has never known the following prescription to fail of giving immediate relief to cattle afflicted with this disorder:

To a pint of water, add half a gill of angua ammonia, or spirits of hartshorn. With this let the creature be gargled, and the cure will be effected.—[Gen. Farmer.]

SOILING HORSES.—The summer feeding of horses was formerly confined to pasturage; but of late years the practice of soiling has become very general. The benefit of grazing consists in its requiring little attendance; and being the most natural, and therefore the most healthful, it is preferable for all young cattle which can be spared from constant labor, and on farms which contain a considerable portion of rough pasture. But for horses at regular work, these advantages are counterbalanced by the time lost in getting them up from the field; the indisposition to labor which they acquire by being at large; and the annoyance which they suffer from heat and flies when turned out in the day-time. The value of their dung and urine is also in a great measure destroyed by being scattered upon the surface of the ground, and exposed to exhalation of the sun and wind; and there is much waste of grass, and injury done to the mellowness of the soil, if it be valuable land, by the treading of all heavy stock, but especially of horses. The utility of soiling consists in a more economical consumption of grass, whether natural or artificial, than by grazing: in the accumulation of manure, and in the quiet and coolness which the cattle enjoy under sheds, or in the stable, during mid-day, as well as their being always ready when wanted: the only disadvantage is the expense of cutting and carrying home the grass, against which may be fairly set the increase of manure, if expense be really incurred; but as, during summer, there is usually a long interval of rest between the morning and afternoon work, the carters can then cut the necessary quantity, which may be drawn to the homestead by one of the team-horses, if there should not be a supernumerary one left for odd jobs.

When, however, the economy of the practice is not the chief consideration, horses on summer work may be both grazed out and soiled. They may be put on cut clover in the middle of the day, between yolkings, and turned out during the night into a well-sheltered meadow or enclosure. In being kept under cover during the heat of the day, they will be sheltered from flies, and will feed more at ease; and in being pastured out during the night, they will also have an opportunity of selecting those grasses which act as condiments and are most agreeable to their palate. All animals like variety of grasses, selecting always what is most palateable, which they cannot do when soiled, particularly if fed on cut clover or tares. Exposure to the night air is also found to be highly favorable both in their health and appearance.

The custom of giving corn along with green meat is unprofitable; for the grain, thus mixed, passes rapidly off the stomach, and is never perfectly digested. When, however, increased exertion demands an addition of more substantial food, and that corn is also allowed, it should be given only in the morning and at night, accompanied with a sufficient quantity of chaff to afford it consistence, and green meat

should only be given at mid-day. Farmers very generally omit that precaution, and it is a common custom among them to allow half the usual quantity of corn, without regard to the effect of the watery juices of grass upon the digestion: but they may be assured that a great portion of the nutriment contained in the grain is thus wasted.

PLANARIÆ.—On January the 27th, at the Royal Institution, Mr. Faraday proceeded to lay before the literati assembled, an account of Dr. R. Johnson's investigations into the *restorative, productive,* and *reproductive* powers of the Planariæ, a genus of small animals allied to the leech, and of which there are several known species, viz., P. torva, lactea, hastata, arethusa, felina, &c., the three first of which are to be found abundantly in a pond near the Red-House, Battersea Fields.

From Dr. Johnson's experiments, it appears that if an incision be made longitudinally into the head of the animal, so as to separate its eyes from each other, if the cut has not been carried very far down, it will heal in the ordinary manner; but if the head be absolutely cleft in twain, then, according to the extent of the fissure, there will be a mass of new matter formed by each half of the head, which will either join the two halves together, forming a head of extraordinary size, and bearing in it one or two additional eyes, or each old half, thus cleft, will form the new matter into another half, with an eye, and so the animal have two complete and entire heads. If the fissure be farther down through the body of the animal, then not only will there be two heads, but two bodies also formed, joined together only by the tail; and when this is the case, so little unanimity does there exist between these *siamoid* twin-planariæ, that they never pull or swim the same way; and so violent are their efforts, that they frequently, in the course of two or three days, tear the only remaining bond of union, their tail, in sunder, and then two distinct and perfect animals result.

If in a common planaria the head be cut entirely off, a new head will be formed; and if its lower extremity be removed, it will produce a new tail. In a planaria, which, by the operation above described, had been invested with two heads, these "nova capita" were successively severed for three several generations, and were immediately and perfectly renewed, and subsequently the animal was cut through just below the artificial bifurcation, and then only a single head was produced, so that in this more simple "capital" operation, a single headed animal became a biceps, and, after having had the use of six heads in succession, was subsequently reduced to the possession of a single one.

When one of these animals is cut in half, the head, or anterior extremity, swims away as if nothing had happened, and speedily retails itself; but the tail swims to the bottom, and remains torpid for two or three days, by which time it has formed for itself a head. If a planaria be cut into three pieces, the head will form a new body and tail, the tail a new body and head, and the middle section or body will produce both head and tail. If a quarter be removed by making a longitudinal incision through the head, and half down the body, and then a semi-transverse cut to remove the upper quarter, not only will the three remaining quarters speedily re-produce a new fourth, but also the separated fourth will form to itself three new quarters. Indeed, a planaria has been cut into as many as ten pieces, and each piece has become an entire and perfect animal. In fact, this mode of propagation, which physiologists artificially institute, seems to be frequently resorted to by the animal itself. The planaria felina has been seen to throw off pieces of its body, to form new animals, and these are not diseased but healthy parts, and not only parts of its tail, but often offsets from its sides, &c. Indeed, the planaria felina, and p. arethusa, have been never known to lay eggs, whilst the torva, lactea, &c. lay them in abundance, both the original animals and those artificially produced. It would seem that those species which inhabit springs and running waters, propagate only by division; but those which dwell in ponds and ditches, where the water is occasionally exhausted, are oviparous, as well as viviparous.

The above facts are physiologically curious, as they show a still closer affinity than had been previously supposed to exist between the propagation of plants and animals by cuttings as well as seeds; for they have shown that this mode of propagation can be carried to an almost equal extent in the one as in the other—an extent to which the experiments of Trembley, and others, on polypi, star fish, &c., did not reach.—[Medical and Surgical Journal.]

ORIGIN OF VEGETABLES.—Turnips and carrots are thought indigenal roots of France. Our cauliflowers came from Cyprus; our artichokes from Sicily; lettuce from Cos—a name corrupted into Gause; shallots, or eschalots, from Ascalon. I have been reading on the subject, and was struck with the humorous ideas on commerce and civilization, which may arise from a dinner. Will you have a desert from memory? The cherry and filbert are from Pontus; the citron from Media; the chesnut from Castana in Asia Minor; the peach and the walnut from Persia; the plum from Syria; the pomegranate from Cyprus; the quince from Cydon; the olive and fig from Greece, as are the best apples and pears, though also found wild in France and even here; the apricot is from Armenia. Truly, all people and nations should love and be grateful to one another for all these mutual blessings, and we should never sit down to partake of a meal without remembering our reciprocal indebtedness for all the copious blessings we enjoy.

REVENUE OF GREAT BRITAIN.—Abstract of the net produce of the revenue of Great Britain, in the quarters and years ended on the 5th of April, 1833, and 5th of April, 1834, showing the increase and decrease on each head thereof.

	Quarters ended April 5.		Increase.	Decrease.
	1833.	1834.		
Customs...	£3,417,250	£3,603,263	£186,013	....
Excise.....	2,600,575	2,703,561	102,986	....
Stamps.....	1,584,038	1,671,450	87,412	....
Post Office.	346,000	334,000	....	£12,000
Taxes.....	509,563	483,351	....	26,212
Miscellan's.	16,478	11,285	....	5,193
	£8,473,904	£8,806,910	376,411	£43,405
	Deduct decrease.....		43,405	
	Increase on the quarter..		£333,006	

	Years ended April 5.		Increase.	Decrease.
	183'.	1834.		
Customs...	£15,516,254	£15,133,005	....	£383,249
Excise.....	14,623,576	14,943,948	£320,372	...
Stamps.....	6,433,268	6,586 098	152,830	....
Post Office.	1,321,000	1,347,000	53,000	....
Taxes.....	5,003,855	4,865,846	....	138,009
Miscellan's.	69,190	51,940	....	17,250
	£42,967,143	£42,927,837	£526,202	538,508
	Deduct increase.....		....	526,202
	Decrease on the year...		.....	12,306

BAIT FOR RATS.—One of our subscribers informs us, and his veracity is unquestionable, that he was advised, in baiting a wire trap to catch rats, to mix a paste of corn meal and raw eggs; he did so, and the first night he caught seven, the second night the trap contained fourteen, from half grown to full grown ones. To use his own words, the trap not being very large, "they were literally piled on one another for want of room." Rats are the most destructive, troublesome, and disagreeable vermin that can infest our premises, and any thing is of importance that will assist us in getting rid of them.—[Ohio Farmer.]

CORN SHUCKINGS—*Loss occasioned thereby.*—The following from the Southern Agriculturist is applicable, in the principle, to northern as well as to southern farmers.

Rocky Grove, Abbeville District,
Dec. 20, 1833.

DEAR SIR,—Throughout the upper parts of our state it is very common for agriculturists to gather their entire crop of Indian corn, or all that one large field contains, before they husk (or as it is commonly termed, "shuck out,") any part of it, and to have it all husked in one night, night being the time when this work is most commonly done. To effect this, a bright moonlight night is selected, and the neighboring inhabitants, whites or blacks, sometimes both, are invited to give their assistance, and a substantial supper with a sufficiency of whiskey is prepared for the occasion. These "corn shuckings" are complete frolics. Two captains are chosen, who divide the company into two equal parties, when, the pile of corn being as equally divided as possible, by laying a fence rail or pole across the centre of the pile, one of which divisions is assigned to each party, the husking commences, each party trying to beat the other in the husking out of their division of the corn pile. The rustic songs, which, by one party or the other, are constantly sung during this race, one person taking the lead in the song, but the end of every line all joining in a chorus; the antic gestures and encouraging exhortations of the respective captains, or some one of each company peculiarly gifted to act such a part, who mounts the pile of corn which they are husking; the earnest exertions of the company generally, and of individuals in particular, who seem to husk as though the fate of the world hung upon the issue; the obstreperous but good natured jokes and brags played off by the winning party upon that which loses the race, all heightened by the exhilirating effects of the bottle occasionally passed round, produces a most inspiriting and animating effect even upon the looker on, and could not but move the most phlegmatic. The corn being nearly husked out, the owner must conceal himself, for at the conclusion, if he is found, (and a diligent search is made for him,) at any moment previous to all hands being called to supper, the negroes will certainly exert the right which custom has given them of hoisting him on their shoulders, and moving in a body three times round the dwelling house, making the air ring with one of their "corn songs," as they are called, and then by one of those "accidents done on purpose," drop him rather unceremoniously from their shoulders. Resistance is useless, nor will even a man's bed protect him if he is unmarried.

It is no wonder, then, that these "corn shuckings" are popular amongst the laboring classes and frequent; but agriculturists are not, perhaps, aware of the loss occasioned by them, which it is the object of this communication to point out. I have but seldom indulged my negroes with them, under the conviction that instead of a saving of time and labor, it is, in fact, a loss of both, and also of corn, independent of the expense of the supper; but I, this autumn, promised to grant them one, resolving to note well the result. Having done so, I caused the pile of husks to be examined the next day as they were put away, when I collected thereout better than two waggon loads of unhusked corn, which had, either by accident or design, probably both, got mixed with the husks. There was also about two waggon loads of unhusked corn under the pile of husked corn. The picking out of this unhusked corn, husking it, carrying the corn into the crib, and housing my husks, occupied all my hands three entire days. This occasioned to me a loss of two days' labor, for had I pursued my usual plan of gathering and husking my corn, with my own hands alone, I would,

by a calculation which could not deceive me, have done it in less time by that number of days; and the quantity of scattered corn left on the ground was so great, that my stock of hogs were several days in consuming it. I should also mention, that one of our planters intending to remove to one of the new States, had a "corn shucking" this year, and sold his pile of husks as they stood on the ground to one of his neighbors. In removing these husks, the purchaser was induced, from appearances, to examine them, when he collected and husked out thirty-five bushels of clean corn, which was sold to him among the husks, and which corn was therefore an absolute gain to him and loss to the other. I have now only to state what course I pursue in gathering my corn crop.

When I commence, I give my negroes the following task: A half waggon load of corn to each full hand per day, to be broke down, hauled to the crib, husked out, cribbed, and the husks carried away and housed. To do this, occupies them until ten o'clock at night, but as this night work happens but at a particular season in the year, and does not last long, and is a work usually done at night, the negroes do it without a murmur. The corn thus husked is thrown at once into the crib, (instead of being thrown on the ground in a pile and carried into the crib the next day, as is done at these "corn shuckings,") and the next morning the husks are removed and put into covered rail pens. On the first day, therefore, of gathering the corn, no husks are put away, but on every succeeding day the husks of the previous day's gathering are put away as a part of that day's task. If, however, the corn field is at a considerable distance from the crib, so as from that or any other circumstance to occasion the consumption of much time in waggoning the corn home, this task would be too heavy. Respectfully,

THOMAS PARKER.

IMPROVED RAW SUGAR.—A most decided improvement has taken place in the manufacture of sugar from the cane juice, and some samples introduced into the market have excited the most eager anxiety from all parties interested in this branch of colonial and commercial intercourse. It is pure raw sugar, obtained direct from the sugar cane, without having undergone any subsequent process of decolorization or refining, prepared by effecting the last stages of the concentration of the cane juice in vacuum, at a temperature insufficient to produce any chemical changes in its constituent parts. By this improved and scientific process of manufacture, no molasses or uncrystallizable sugar is formed, and there is hence an increase in the quantity of sugar obtained of 25 per cent. Whilst this establishes the philosophical fact, that molasses are not an *educt* of the cane, but were merely a product of the former operation, from the intense and long continued degree of heat employed in the processes, this saving from the vast quantity of deteriorated material must be considered an object of the very first importance to the planter, in the increased quantity of his production, which is likewise obtained in a very far superior degree of quality and purity; and readily commands a price of £10 to £12 per cwt. additional in the market.

The sugar, thus obtained, is in perfect, pure, transparent, granular crystals, developing the true crystalline form of the sugar, and being entirely free from the least portion of uncrystallizable sugar or coloring matter. It cannot fail to insure a preference in the market for all purposes of manufacture, solution, or for domestic economy, as it is a purer sweet than even the best refined, and possesses a rich mellifluous taste, not approached by that obtained by any other process, whilst it is not apt to become acescent in solution.

In addition to the great advantages to the planter, in saving from the vast quantity of deteriorated material, and that extensive state of partial decomposition, in which the raw sugar has uniformly been transmitted to our hands, the time and labor of the operation is greatly decreased, the apparatus possessing the power to make double the quantity in the same space of time as the old method; and this is ready for shipment in four days, in lieu of three weeks, as heretofore. In the manufacture of rum, all danger of deterioration in the production of empyremua is avoided, and a far purer spirit is obtained by the use of the molasses, which are separated by this process.

The new process is now in complete and successful operation in eight estates at Demerara. From the results of the first trials, the introduction of the present improved process cannot fail soon to become general; while it is considered, by the best practical judges, to open sure and certain means of re-vivifying the spoiled fortunes of the planters, and to be of the most material influence in promoting the future prosperity of our West Indian Colonies.—[Medical and Surgical Journal.]

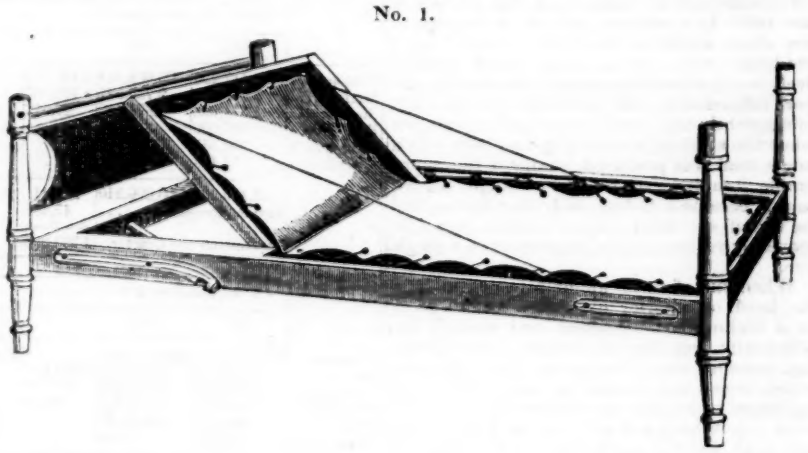
D'ARCET'S APPARATUS FOR EXTRACTING GELATINE.—On March 9, at the Royal Institution, M. D'Arcet's improved apparatus for extracting gelatine from bones was exhibited, and some of the soup made in the theatre. It is an improvement of Papin's digester. It is a pity that these machines are not more used in England, for we heard that 800,000 rations of soup are made in Paris weekly from bones; and we are informed, that if the bones of an ox were put into the digester, and the whole of the flesh into any other vessel, that the bones would yield one-third more gelatine for soup than the whole of the meat; *i. e.*, the proportions of the former would be as three, the latter as two. The fibrine, of course, would be eatable and useful: it is of the soluble matter only that account is here taken. The refuse of the bones, after the gelatine is removed, forms excellent materials for making animal charcoal.—[Medical Gazette.]

GOLENOS OAK.—This large tree, which was felled in 1810, grew about four miles from the town of Newport, in Monmouthshire. The main trunk at 10 feet long, produced 450 feet; one limb 355, another 472, a third 235, a fourth 156, a fifth 106, a six 113, and six other limbs of inferior size averaged 93 feet each, making the whole number 2426 cubic feet of sound and convertible timber. The bark was estimated at six tons; but as some of the heavy body-bark was stolen out of the barge at Newport, the exact weight is not known. Five men were twenty days stripping and cutting down this tree; and a pair of sawyers were five months converting it, without losing a day, Sundays excepted. The money paid for converting only, independently of the expense of carriage, was £82; and the whole produce of the tree, when brought to market, was within a trifle of £600. It was bought standing for £405. The main trunk was 9½ feet in diameter, and in sawing it through, a stone was discovered, six feet from the ground, above a yard in the body of the tree, through which the saw cut; the stone was about six inches in diameter, and completely shut in, but round which there was not the least symptom of decay. The rings in its butt were carefully reckoned, and amounted to above 400 in number, a convincing proof that this tree was in an improving state for upwards of 400 years; and as the ends of some of its branches were decayed, and had dropped off, it is presumed it had stood a great number of years after it had attained maturity.—[Time's Telescope, vol. 3.]

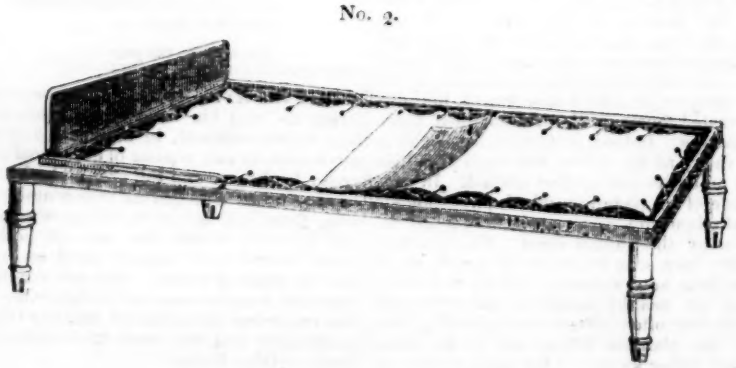
WOOLLEY'S PATENT IMPROVED BEDSTEAD FOR INVALIDS.—Mr. Woolley has been some time constructing a bed for invalids, which will also answer as one for ordinary use. Fig. No. 1 represents the ordinary bedstead improved, either as a French bedstead or field-post one, raised to suit any elevation in the centre, to make it a chair, supported by cords, or rods of cast iron.

No. 2 is an ordinary cot bedstead, which,

No. 1.



No. 2.



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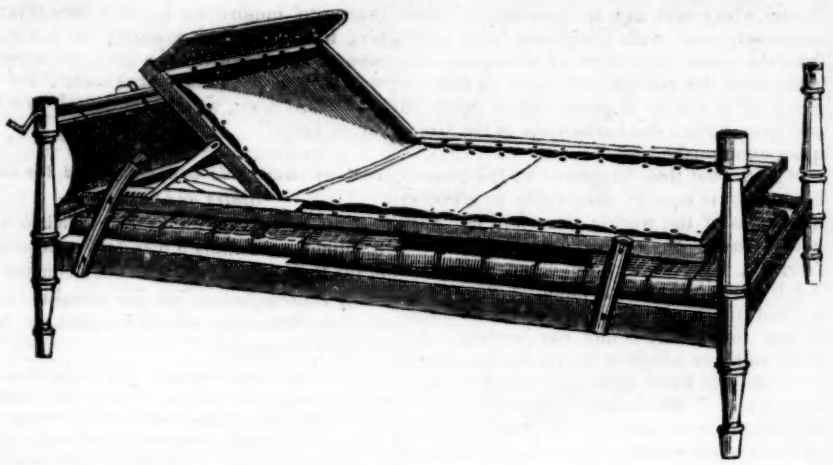
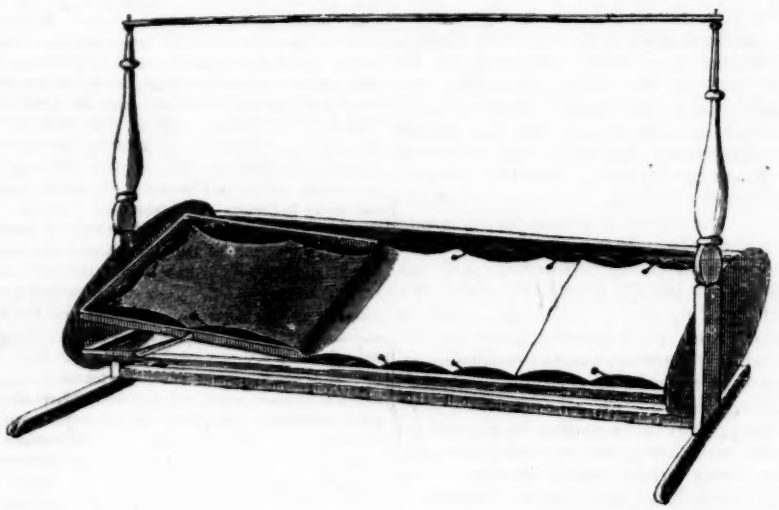


No. 4.



divested of its legs, is made advantageous to the invalid when placed on the top of No. 3. The sacking of No. 2 is used as a sheet when there placed, and can be tightened quickly or not, as may be necessary, which, in cases of fractures, is sometimes of great importance; under No. 2, when moved to the top of No. 3, is a mattress, and the whole is moved by levers, to two of which a cord is attached, and by means of a small crank can be raised or lowered, as best suits the patient's inclination, by a child of 10 or 12 years.

No. 4 consists of No. 2 placed on a frame similar to the swing cradle, by which those who are afflicted with ulcers, &c. can be frequently turned with ease, and without incurring additional pain.

The price does not much exceed the ordinary price of bedsteads. Mr. Woolley has shown us several certificates from some of the most eminent medical men in this country, stating that in their opinion his invention is calculated greatly to mitigate the sufferings of all who may be confined to their beds by sickness or otherwise.—[Mech. Mag.]

To drive away Bed-bugs.—Make a strong decoction of red pepper, when ripe, and apply it with a common paint brush to the joints of the bedsteads, wainscoting, &c. where these odious insects usually resort, and it will speedily kill or expel them.

Sugar an Antidote to the Poison of or from Copper.—So many accidents occur from using copper vessels, that we deem it proper to give the most simple directions for counteracting the poisonous effects of the oxide of this metal. Sugar is a most powerful antidote against verdigris and other preparations of copper, although it is difficult to understand in what manner the beneficial process is conducted. M. Duval introduced, by means of an India rubber tube, four drachms of oxide of copper dissolved in acetic acid into the stomach of a dog; in about four minutes afterwards he injected by the same medium four ounces of strong syrup; this dose he repeated at intervals of half an hour, until he had injected twelve ounces. During this time the animal experienced much nervous excitement, and was slightly convulsed; but after the last injection he became perfectly calm, and having gone to sleep, woke without feeling any farther effects of the poison. M. Orfila relates several instances of persons who had taken acetate of copper, either accidentally or designedly, having been recovered by the administration of sugar. He several times proved by experiment that a dose of verdigris, which would otherwise have killed a dog in an hour or two, might be swallowed with impunity if previously mixed with a quantity of sugar. As alcohols have a property which neutralize the most concentrated muriatic acid in ethers, it would appear sugar neutralizes the oxides of copper and lead. Subtartarate of neuter lead was, indeed, used by Berzelius in his experiments to determine the proportional parts of sugar. If an ounce of white sugar be boiled for half an hour in a phial, with an ounce of water and ten grains of verdigris, a green liquid will be procured, in which the most sensible re-agents will not indicate the presence of copper, such as hydro-ferrocyanate of potass, ammonia, and hydro-sulphuro; but an insoluble carbonate of copper will remain at the bottom of the vessel.—[Journal des Connaissances Usuelles.]

New Cement.—The late conquest of Algiers by the French has made known a cement used in the public works of that city. It is composed of two parts of ashes, three of clay, and one of sand. This composition, called by the Moors *Fabbi*, being again mixed with oil, resists the inclemencies of the weather better than marble itself.—[Beija Flor.]

Cheap and durable Paints.—It has long been a desideratum to save the great expense of oil and lead in outside painting, but hitherto it has not been obtained. Last summer, while travelling in company with an intelligent lady from New-Haven, we obtained from her the following recipe. She said she felt it her duty to spread the information, having seen it tested. We have tried it, and those who feel interested may satisfy themselves by examining a piece of fence, on our premises, painted with this composition. It is of a cream color, but bleaches, and is now (5 weeks) nearly as white as lead paint. There appears to be an adhesive solid body, which has been unaffected by storms. How it may appear a year hence, we of course cannot say—but we have strong confidence in it. The expense of the materials is but about one-fifth of oil and lead.

To one gallon of good milk, add two dozen eggs, and 1½ lbs. loaf sugar—then add sifted slacked lime, (white,) to bring it to a proper consistence. To be put on the same day. It will be well to run the whole through a paint mill—or, otherwise, to see that the coarser particles of the lime are well dissolved.—[N. H. Sentinel.]

A Cheap and Useful Water-Cart.—I subjoin a description of a very cheap and useful water-cart. A barrel, holding 100 to 200 gallons, is placed on a pair of wheels and shafts in the usual way. A pump, three inches in diameter, is placed close by the side of the barrel, and to the under end of the pump is made fast a leather pipe of indefinite length, with a rose copper end, and in the pipe small copper or tin rings are placed, two inches distant, to prevent the external air from pressing together the sides of the pipe, and thus excluding the water. The cart being placed on the bank of a river, brook, or pond, and the pipe thrown into the water with the rose end immersed, a man will pump 150 gallons in 10 minutes, without the trouble of having a road into the bottom of the river, and with the great advantage of the horse standing dry, and not plunged into three feet of cold water in a winter day, in the usual way of filling by ladle and standish. A stop-cock is fixed behind for discharging the water. When the cart is travelling the leather pipe lies over the barrel, fastened by two iron catches.

The barrel being filled, and driven to the place required, the leather pipe is immersed in the barrel by a hole in the top, sufficient to admit the rose end. A small iron rod screws down by the side of the piston rod, upon the upper valve, and shuts it fast. A rising main, with a check valve, is opened between the two buckets in the pump, upon which is screwed fast a leather pipe with a copper tube on the end. One man directing this pipe, and another pumping, converts the cart into a sort of fire engine, that may be very useful in cases of emergency, throwing the water 40 feet horizontally, and over any house of two stories, any hay stack or corn rick, and also very useful for garden walls and fruit trees. By increasing the size of the barrel, and by

applying more power, a very sufficient engine may be made, and answering other purposes at the same time. The above described is very simple and cheap, and is very useful.—JOHN DONLDSON.—[British Farmers' Magazine.]

LANGUAGE.—Attempts have been made to account for the variety of languages in the world on natural principles. Difference of climate, intercourse with different nations, and the fondness of men for variety and change, are the principal causes assigned by those who take this ground.

Now it must be admitted, that difference of climate will cause some change in language in respect to pronunciation. It will abound in aspirates, labials, dentals, or other particular sounds, according to climate. Intercourse with different nations, also, introduces variety into language; but at the same time it tends rather to *assimilate* the languages of different nations to one another, than to *widen the difference*. With regard to a love of novelty and change, this is no doubt a cause of some alteration, especially when we consider the various circumstances which combine to render new words necessary.

"These are the general reasons of the mutability of language; and it is apparently true, that some or other of these have, ever since the confusion of Babel, kept the languages of the world in a continual variation. The Jews mixing with the Babylonians, when they were carried into captivity, quickly altered and corrupted their language, by introducing many Syracisms and Chaldaisms into it. And afterwards, when they became subject to the Greeks and Romans, their language became not only altered, but as it were lost, as any one will allow, who considers how vastly the Hebrew differs from the Rabbinical diction, and the language of the Talmuds. The Greek tongue in time suffered the same fate; and part of it may be ascribed to the Turks overrunning their country, and part of it to the translation of the Roman empire to Constantinople. But some part of the change came from themselves, for, as Breerwood has observed, they had changed many of their ancient words long before the Turks broke in upon them; of which he gives several instances out of the books of Cedrenus, Nicetas, and other Greek writers.

"The numerous changes which the Latin tongue has undergone, may all be accounted for by the same reasons. They had in a series of years so diversified their language, that the Salian verses composed by Numa were scarcely understood by the priests in Quintilian's time; and there were but few antiquaries within about three hundred and fifty years who could read and give the sense of the articles of the treaty between Rome and Carthage, made a little after the expulsion of the kings. The laws of the twelve tables, collected by Fulvius Ursinus, and published in the words of the kings and decemviri who made them, are a specimen of the very great alteration which time introduced into the Latin tongue. Nay, the pillar in the capital, erected in honor of Drusillus, about one hundred and fifty years before Cicero, shows, that even so small a space of time as a century and a half caused great variations. After the Roman tongue attained the height of its purity, it quickly declined again, and became corrupted; partly from the number of servants kept at Rome, who could not be supposed to speak accurately and with judgment, and partly from the great concourse of strangers, who came from the remote provinces, so that the purity of it was in a great degree worn off and gone before the barbarisms of the Goths quite extinguished it.

"And what thus happened in the learned languages is equally observable in all other languages of the world: time and age vary every tongue on earth. Our English, the German, French, or any other, differs so much in three or four hundred years, that we find it difficult to understand the language of our forefathers; and our posterity will think ours as obsolete as we do the speech of those who lived ages ago. And all these alterations of the tongues may, I think, be sufficiently accounted for by some or other of the causes before assigned; but none of them shows how or by what means the confusion at Babel could be occasioned. Our builders had travelled from their ancestors many hundred miles, from Ararat to Shinar; the climates may differ, and suppose we should imagine the country to affect the pronunciation of the children born in it, yet still it will be hard to say that this should cause confusion; for since they were all born in or near the same place, they would be all equally affected, and speak all alike. Besides, a difference of pronunciation causes difficulties only where persons come to converse, after living a distance from one another. An imperfection in our children's speech, bred up under our wing, would be observed from its beginning, grow familiar to us as they grew up, and the confusion occasioned by it would be very little. And as to any commerce with other nations, they had none; they were neither conquered nor mingled with foreigners, so that they could not learn any strange words this way. And though there have been many changes of language from the variation of men's tempers, these we find have been frequent since this first confusion; but how or why they should arise at this time is the question. Language was fixed and stable, uniformly the same for almost two thousand years together; it was now some way or other unfixed, and has been so ever since. Some considerable writers seem to acknowledge themselves puzzled at this extraordinary accident. The confusion of tongues could not come from men, says St. Ambrose; for why should they incline to do mischief to themselves, or how could they invent so many languages as are in the world? It could not be occasioned by angels, good or bad, say Origen and the Rabbins, and other writers, for they have not power enough to do it. The express words of Moses, "Go to, let us go down and confound their language;" and again, "the Lord did confound the language of the earth," says Bishop Walton, imply a deliberate purpose of God himself to cause this confusion, and an actual execution of it. And the way in which it was performed, says the learned Bochart, immediately and without delay, proves it the immediate work of God, who alone can instantly effect the greatest purposes and designs. Several of the Rabbins have inquired more curiously into the affair; but we fear the account they have given of it is poor and trifling. Buxtorf has collected all their opinions; but they seem to have put him out of humor with the subject, and to occasion him to conclude in the words of Mercerus, "There is no reason to inquire too curious into this matter; it was effected instantly, in a way and manner of which we can give no account; we know many things were done; but *how* they were done, we cannot say. It is a matter of faith."

List of Railroads and Canals in the United States and Canada.

From a very useful work, published by D. K. Minor, containing a map and a description of the Railroads and Canals either constructing or in contemplation, we are permitted to extract the following, which contains the whole of the descriptions.

In referring to particular works now under construction and in contemplation, there is no one, perhaps, which will show more forcibly the great advantages of railroads, than that which is rapidly progressing through the Atlantic states to the Mississippi: at this time, it is true, in many detached parts, but destined ultimately, and at no distant day, to become *one grand whole*. It can even now be traced from Boston to the "father of rivers," as the Mississippi is called. The entire route, with the exception of those sections on which steamboats obviate the necessity, is either *made*, making, under examination, or soon to be explored; to wit, from Boston to Providence, made and making; New-York to New-Brunswick, making; from Amboy to Camden, and from Trenton to Philadelphia, making; Philadelphia to the Susquehannah, thence to Baltimore, made and making; thence to Winchester, Va., nearly completed, and from Baltimore to Washington, making. From Harper's Ferry, or Winchester, there are two routes, one to the Ohio River, and the other through the valley of Virginia to Tennessee, or to, and down the *New* and *Kenhawa*, or both, or all; and all of which are important, *all will be, if we remain a united republic*, at some future period, constructed. Another important route is through the *Atlantic* states to Georgia, and thence to the Great River. By looking at the map a route will be traced, some parts of which are already completed, and many others are either under contract or exploration, and the entire remainder in contemplation. This is a work of va- importance to the southwest, as well as to the states through which it passes. Those having seaports will intersect it by lateral roads, with a view of diverting to their own storehouses and ships the rich freights from the interior, and of returning from those ships and store-houses the necessaries and luxuries of life, for the rapidly increasing population of the south-west. Savannah will have, Charleston has already, North Carolina is now making, and so is Virginia, railroads to intersect this MAIN ARTERY. Maryland and Pennsylvania have nothing to ask. They "fight on their own hook;" they have taken a lead which admits of little competition. New-Jersey will do her share; and as for New-York, not a work of improvement is made parallel with, or in any other direction to this main road, which will not contribute to her prosperity. There are *two* works, however, in which she is more directly interested, viz., the New-York and Erie Railroad, by which she will secure the travel in a *direct* line, which alone will in a few years pay a rich income upon its cost. The other—yes, the OTHER—is on a still more magnificent scale: it is a STEAMBOAT CANAL *from the Hudson to Lake Ontario, thence around the Falls of Niagara, and thence from Chicago to the navigable waters of the Illinois River.* This is a work which will do honor to our country. It will open at once to those who seek a residence in "the far west," an easy mode of disposing of the productions of a soil rich almost beyond comparison, and a climate in which health and happiness may be enjoyed, if it can be in any climate.

This is a work, or rather *these are works*, which *will be accomplished*, and become to this Union the CABLE of safety, while other works serve as the *standing rigging* of the ship.

Should any one be disposed to term these views visionary, or enthusiastic, let him reflect for a moment upon what *has* been accomplished within a quarter of a century, and he will at once say another quarter will accomplish much more than is here marked out.

LIST OF RAILROADS.

BOSTON AND WORCESTER RAILROAD.—This Company was incorporated June 23d, 1831, with a capital

stock of $1,000,000. Surveys had previously been made by the authority of the Legislature of the State, with a view to determine its practicability and expense, the result of which was altogether unfavorable. In 1831, however, the Company commenced their approximate location, which was completed in November of the same year, and shortly after part of the line was put under contract. The line, as now laid down, leaves Boston not far from the foot of the Common, and after passing over the flats at the mouth of Charles River, on a construction partly of arches of masonry built on piles, and partly of trestle work, it proceeds up the south side of the valley of this river to Newton, a distance of 8 miles. Two miles farther, the line crosses the river on a bridge of a single span of 120 feet. It is built after Long's patent. The abutments are of hammer-dressed dry masonry, in height above river 35 feet, and cost $6000. One mile farther, it enters Needham by a short heavy cut of 60 feet, immediately succeeding an embankment 600 feet long, and 30 feet high. Soon after it passes through a cut 31 feet high, and 500 long, excavated through a hard granite formation. The line then enters a pond half a mile long, and originally 7 feet above grade, the drainage of which passes down along the road, which is here constructed on piling, 35 feet deep. Thence, crossing the Worcester Turnpike, it follows parallel to the line of the Central Turnpike, to the south end of Morse's Pond, which it passes on an embankment 47 feet high and 700 feet long. Here it enters Natick by a rock cutting of 20 feet, forming a summit, whence it descends at the rate of 30 feet per mile to the south end of Natick Pond, which it doubles by a strong curve. Thence the line passes by easy grades and light work to the valley of Concord River, the bend of which is crossed at Shepherd's Mills by two bridges, of the same kind of masonry as previously described; one of two semicircular arches of 22 feet span and 18 feet rise, the other of 17 feet span and 4 feet rise. Ascending the valley of Concord River to its rise in Westboro' Swamp, (3 miles long,) it passes the town of Westboro' and a dividing ridge, and enters the valley of Elizabeth River. Ascending again, to its head, it passes a summit at Cutler's Peak into the valley of Long Pond, which it passes on a high embankment one-fourth of a mile long, over soundings averaging 20 feet in depth. Thence, rising 30 feet a mile, over a rough country, it passes through the main dividing ridge, 500 feet above tide, by a cut 37 feet deep and 1500 feet long, of hard slate rock, into the valley of the Blackstone River, crossing which it immediately after enters Worcester. The Clarence pattern of rail has been adopted for the whole line. The chairs are fastened immediately to the sleepers (chesnut and swamp cedar,) laid transversely in pits of well rammed rubble. The whole cost of superstructure is about $6000 per mile of single track. The grading for a greater part of the line is finished; that for the remainder, and the laying of the rails, is rapidly progressing, so as to leave but little doubt but what it will be opened through its entire length by the spring of 1835. Eight miles of the road have been opened since April, upon which a locomotive has daily carried an average number of 230 passengers. The whole road is going on successfully, and nothing as yet has occurred to lessen the belief that it will be finished at the time and for the sum contemplated in the original estimate of the engineer, upon whom the work is calculated to reflect the highest credit. The table of ascents and descents is as follows:

16 1-4	miles are	level	
2 5-8	"	rise	13 feet
5	"	"	21 "
3.4	"	"	27 "
13 5-8	"	"	30 "

43 1-4 miles total distance.*

Boston and Lowell Railroad, Massachusetts.—This road was incorporated June 5th, 1830; construction commenced November 28, 1831; length of road, 25 1 2 miles; width of way, 26 feet in cutting, and 24 feet on embankment. The road is to be formed for two tracks, but only one will be laid through at present. About 8 miles of one track, and 2 or 3 miles of the other track, are laid. The excavations and embankments are principally done, and also the bridges and culverts. The trench walls are nearly completed. There will be 69 river and road bridges, 18 under, and 51 over the railroad, beside 12 streets and passage ways to be crossed on a level. The iron rails to be used are of the Liverpool and Manchester, or fish-belly pattern, in lengths of 12, 15, and 18 feet, weighing, with the cast iron chair, about 55 lbs. per lineal yard, chairs 17 lbs. The rails are to be supported every 3 feet on chairs, bolted to stone blocks and stone sleepers, which rest on continuous trench walls, the bottoms of which are 2 1-2 feet thick, and from 30 to 36 inches below the surface of the road-way. The space in the clear, between the rails of a track, is 4 feet 8 1-2 inches, and the top of the rails will be 10 1-2 inches above the surface of the road. The space between the tracks is 6 feet. The stone blocks are generally of granite, and contain 3 1-2 to 4 cubic feet. The stone sleepers which lay across the track are 7 feet long, and vary from 6 by 12 to 10 by 12 inches square. The line of the road crosses Charles river, by a wooden bridge 1,600 feet long. The inclination of the road will not exceed the rate of 1 in 528, or 10 feet to the mile, except a short portion in Lowell. The curves are intended to be of 3,000 feet radii, and upwards, except about 500 feet across the canal in Lowell, where the radius of curvature will be 1,200 feet. There will be about 29 portions of curved line, and 30 portions of straight line. The longest straight line will be short of 3 miles. All the level portions will not exceed 1 1-2 miles. The railroad at the depot in Boston will be about 7 feet above base, or ordinary high water mark. The greatest elevation is in Billerica, 4 miles from Lowell, and is 118 feet above base, and the terminus in Lowell 87 feet, or 80 feet above the depot in Boston. This railroad will open a communication between Boston and the manufacturing town of Lowell, situated on the right bank of Merrimack river, 30 miles above its mouth at Newburyport.

There is a deep cutting near its termination at Lowell, which is a matter of great curiosity. The road is to pass through a ledge of rocks, about 300 yards in length, at an average depth of excavation of 40 feet. The passage is 60 feet wide at top and 30 at bottom. The job was originally taken at $72,000, but a first and second contractor failed in the undertaking.

From Lowell the river is made navigable 50 miles, to Concord, N. H., by means of locks and short canals built thereon; and, by the Middlesex canal, which enters the Merrimack 2 miles above Lowell, a water communication of 30 miles is open from Lowell to Boston. Very little agricultural produce is brought by this communication down to Lowell or Boston, but large supplies of wood and lumber are obtained. All kinds of foreign productions generally consumed in the country, with grain and flour from the middle states, are carried up by the canal and river, and distributed at the various landings. The manufacturing establishments at Lowell, on the Merrimack, and its tributary streams, have been the cause of the principal traffic carried on upon their waters. It is now 40 years since these works for inland navigation were commenced, and their value has been much improved by the increase of manufactories in their vicinity.

This railroad is the offspring of the same spirit of improvement which has built up Lowell, and it is owned chiefly by the same persons, who have invested large sums to carry on the works there.

The large amount of cotton, wool, iron, coal, oil, dye stuffs, manufactured articles, &c., &c., to be transported by the various manufacturing companies at Lowell, with the passengers, will be to the railroad the main source of its income, until other railroads shall be extended farther into the country.

Boston and Providence Railroad.—This company was incorporated in 1831; the work was commenced in Dec., 1832; two-thirds of the grading is now, June 20, 1834, accomplished; 11 1-2 miles of railway are now in use. The road bed is graded for a double track, being in no place less than 26 feet wide, and in the deep cuts 30 and 40 feet. The length of the road is about 41 miles. The capital of the company is $1,000,000, and the estimated cost is within the capital. This railroad will undoubtedly be a portion of the "great route" for communication between New-York and Boston. It is the straightest route, (taking into view its length,) in the world. The curves are mostly of 6,000 feet radius; there is one continuous straight line of 16 1-2 miles. The rail is of the heaviest, weighing 55 lbs. to the yard; is laid on cedar sleepers. The road passes through the townships of Roxbury, Dedham, Canton, Mansfield, East Attleboro' and Seekonk, traversing a most beautiful country. Locomotive engines are used. The passenger cars of the best kind, made in New-Jersey, by the Messrs. Greene.

In Canton, over the Stone Factory Pond, there is a splendid structure, 450 feet in length, and from 40 to 50 feet above the natural surface, built entirely of granite, in the most permanent manner. It is called the "Canton Viaduct," and is one of the finest structures of the kind in the United States. There are 15,000 perches of solid masonry in this structure. It is being built by Messrs. Dodd and Baldwin, of Pennsylvania. The entire road is being built in the most permanent manner. The Stonington and Providence Railroad will probably connect with this, making the distance from Stonington to Boston 89 1-2 miles.

Stonington and Providence Railroad.—This road is to commence at Stonington Cove, on Long Island Sound, to which place there is an almost entire uninterrupted steamboat navigation from New-York during the year, and extends to Providence, R. I., 48 1-2 miles, where it will probably connect with the Boston and Providence road, and thereby make an uninterrupted communication between Boston and New-York during the whole year. The elevation to be overcome does not exceed 302 feet, and may be so distributed as to be adapted to locomotive engines. The following shows the character of the route: 14.75 miles level, and under 2 feet; 7 miles under 8 feet; 13.66 under 13 feet; 3.81 under 20 feet; 7.19 under 26 feet; 1.36 under 34 feet to the mile, which gives an average of about 12 feet per mile. The work is to be graded for a double track, but for the present a single track only is to be laid down, with occasional turn-outs, and an edge rail of sufficient strength to require supports every 4 feet. The grading of the route for a double track is estimated to cost $505,830.90; the superstructure, $480,000; land and fencing, $50,000; moving power, cars, agencies, &c. &c., to complete $103,583.09. Total, $1,139,413.99. Operations commenced on this road in 1833, and the work is progressing.

Lowell and Brattleboro' Railroad, Vt.—This road is not yet chartered.

Boston and Salem Railroad.—Contemplated; not commenced.

Boston and Taunton Railroad.—Will probably be connected with the Boston and Providence road at some convenient place.

Worcester and Norwich Railroad.—A charter was granted for this road in 1832. A survey was made, by which it was ascertained to be a very favorable route. The distance from Worcester to Norwich is 60 miles. The country fertile and densely populated. The legislature of Connecticut granted a highly favorable charter, connecting with it a bank, which is required to subscribe for a part of the stock. Nothing has been done, as we are aware of, towards making the road. The distance from Norwich to Boston by the way of Worcester, by the railroads, is 103 1-4 miles.

Quincy Railroad.—A charter was granted for this road in the winter of 1825-6. The object of this road was to communicate with the granite quarries, on the Neponset, about 3 miles from tide water. It was at first laid down with wood, which has been replaced with granite sills. The rail used is the flat bar of iron, 3-8 of an inch by 3 inches, secured to the sills by 3-8 inch iron bolt, 3 inches in length, the head of which fits into a countersink. It is said to be done in the most substantial manner. The sills are laid on rubble stone, placed in a trench 2 1-2 to 3 feet in depth, closely rammed, with a cross piece of granite, 7 feet in length, every 6 feet. Each car carries from 6 to 7 tons; its own weight being about 3 tons. This road has a descent of 27 feet to the mile, in addition to an inclined plane, which descends 84 in the distance of 380 feet. Chains are used instead of ropes for lowering the cars. The empty, or returning cars, are moved up the inclined plane by the descent of the loaded ones. The cars are moved to the landing by horses, at the rate of 3 1-2 or 4 miles per hour, each team of 3 horses taking seven loads, of 4 cars each, or 150 to 160 tons per day. It is found that the labor of transportation is much easier on the granite than it was on the wood sills.

Boston and Ogdensburgh Railroad.—Chartered by the different states, and formerly much talked of. Should it ever be carried into operation, it will probably connect at Lowell, with the Boston and Lowell road, passing through Concord, N. H., cross the Connecticut, at the mouth of *White* river, at Hartford, Vt.; thence to Montpelier and Burlington, from whence to Plattsburg steamboats would be used during the summer. The result of this work, should it be completed, will be to divert much of the Canada trade to Boston, which will be of immense advantage to that city.

Mohawk and Hudson Railroad.—This was the first railroad chartered in the state of New-York. It was commenced in 1830, when there was of course very little information upon the subject of railroads in the country, and it therefore progressed slowly in

* Since this account was written, a distance of about five miles further has been opened.

its earliest stages. It has cost the company a large amount of money. The plan and profile are admirably designed, and justify the great expense which the heavy embankments and excavations have required. $483,215 46 have been, and $156,693 will be, expended in completing the work, according to the official report made to the Legislature of New-York in January, 1832. This includes the cost of the second track. It is proper to state that about $100,000 of the above sum should be deducted for land, (13 acres are owned in Albany alone,) depots, engines, waggons, &c.

The road commences on the bank of the Erie Canal, at Schenectady, and runs parallel to it for 20 chains—then a curve of 10 chains.

	Miles.	Chains.	Grade.	Inclination.
From Schenectady to foot of inclined plane	0	32	level	
Inclined plane	0	31	rise	1 in 18
Then runs	3	44	level	
" "	2	10	descent	1 in 450
" "	1	40	level	
" "	2	53	descent	1 in 225
" "	1	7	level	
" "	3	11	descent	1 in 270
" "	0	2	level to head of pl.	
Then Albany plane	0	47	descent	1 in 18
Then to dock head on the Hudson at Albany	0	22	descent	1 in 500
Total	15	69		

When excavation occurs in the grading, the width for a double road is 38 feet; when embankment occurs, the width on the level of the road is 26 feet.

The greatest height of embankment is 44 feet; and the deepest excavation is 47 feet.

On the first grade, at Schenectady, below the inclined plane, there is one curve, about 10 chains in length, on a radius of 700 feet. There is a curve at the head of each inclined plane, about 8 chains each, on a radius of 1100 feet: between these two there are two other curves, one on a radius of 4,200 feet, 9 chains long—and one on a radius of 23,000 feet, 6 chains long. The only other curve is between the foot of the Albany plane and the river, on a radius of 4,000 feet.

The wooden cross sleepers are 7 inches in diameter, and 8 feet long.

Stone blocks contain each 2 cubic feet, and cost 45 cents. They are laid 3 feet apart, from centre to centre, on a foundation of broken stone, well rammed.

The iron rail plate is a bar 9-16 by 2 1-2 inches, with the upper curves rounded to 1 7-8 inches width. The timber rails are yellow or Norway pine, 6 by 6 inches. The width between the rails is 4 feet 9 inches.

The summit is 335 feet above the Hudson. Much of the cost of this railway has been incurred for broken stone.

There are two stationary engines, one near each end of the road. Locomotive engines are mostly in use, although horses are occasionally used. The main line of the road approaches the Hudson below the city, where the company have warehouses for freight. There is also a branch road into State street to the depot, and also to the basin, which has cost near $100,000. It is, however, used only for passengers. This road has cost about $40,000 per mile, yet it will be a good investment for those who *hold* the stock. Chartered in 1826; capital $600,000.

SARATOGA AND SCHENECTADY RAILROAD.—This road was commenced the 1st of September, 1831, and was opened for travelling 12th July, 1832, except a short distance at Ballston, which was completed in April, 1833. Its length is 21 1-2 miles. Its cost, $217,201.22, exclusive of the land it occupies, and some trifling agencies and travelling apparatus, but including every thing, when in complete operation, $297,237. About 3 miles of it is put down on stone foundation. Trenches were dug 2 1-2 by 2 1-2 feet, and filled with broken stone, closely rammed; and upon this square blocks of about 2 cubic feet were placed, 3 feet from centre to centre. On these stone blocks, cast iron chairs are placed to receive the wooden rails, upon which is the iron plate. Cross-ties of timber secure the rails from spreading. The remainder of the road is laid upon longitudinal sills, upon which the sleepers rest, notched on both sides, to secure the sills in their place, and also to receive the wood rail, upon which rests the iron plate, as in the first part of the road. It has but a single track, with turn-outs. The road is mostly level, and in no case does the inclination exceed 16 feet to the mile. Steam power is used to great advantage, and the net income of the road from April 1, 1833, to February, 1834, was within a fraction of 10 per cent. upon its capital. It will be much more profitable when the Saratoga and Fort Edward road shall be completed, so as to bring the travel from the north via Saratoga to Albany. Chartered in 1831.

ITHACA AND OWEGO RAILROAD.—This was the second chartered railroad in the state, 1828. Its capital, $300,000; is 29 miles in length, and has two inclined planes ascending from Ithaca. The first is 1,733 1-3 feet in length, and rises 1 foot in 4.28, or 405 feet; the other is 2,225 feet long, and ascends 1 in 21 feet. The whole elevation above the Lake overcome is 602 feet, within 8 miles; after which there is a descent of 376 feet to Owego. Stationary power is used on the first, and horse power on the other plane, as well as upon the other part of the road. The curves are upon a large (say from 7,000 to 100,000 feet) radius. The road is constructed in a substantial manner. Much of the way trenches are made lengthwise, about one foot deep, filled with gravel rammed, upon which longitudinal sills, 4 by 12 inches, are placed; then cross-ties are placed 3 feet apart, with gains to receive the rail, upon which the iron plates, 2 1-4 by 5-8 inch, are laid. The width of the track is 56 1-2 inches. It is in successful operation, and will add greatly to the prosperity of the two flourishing villages at its extremities. It will eventually connect with the New-York and Erie Railroad at Owego, and with the Ithaca and Geneva Railroad at Ithaca. There can be no question of its great utility, nor of the value of the investment.

HARLAEM RAILROAD.—This road was chartered in the winter of 1831, with a capital of $350,000. The work was commenced in the spring of 1832. The grade was required to correspond with the regulation of the streets, which has required much deep cutting and some high embankment. About 4 miles of the road are now in use, upon which pleasure cars constantly run for the accommodation of those who desire to get out of the city for a short time. When completed, there will be a tunnel of some length through a rock, at Yorkville, after which there will be a gradual descent to Harlaem river. The work thus far has been very expensive, and will cost, when completed, at least its whole capital, and probably more. At present horse power is used. A locomotive engine was provided and used for a short time, but the boiler burst, and the engine was laid aside.

This road will probably be connected with the New-York and Erie Railroad, if that work should be constructed, as now contemplated, entirely within the limits of the state, as it will in that case probably cross the Hudson some miles above the termination of the Harlaem road. It will hardly be deemed worth the while to construct another road by its side.

ROCHESTER RAILROAD.—This road extends from Rochester to the head of ship navigation, on the Genesee river, about 3 miles, in which it has a descent of 254 3-4 feet, 156 1-2 of which is within 1,000 feet of its termination. It cost a fraction less than ten thousand dollars per mile; was completed and in use the 1st January, 1833. Chartered in 1831; capital $30,000.

BROOKLYN, JAMAICA, AND LONG ISLAND RAILROAD.—The road to Jamaica has been located, and will be made within a year or two; but that part beyond Brooklyn to Sag Harbor, designed as a substitute for steamboat navigation on the Sound, with the exception of about 25 miles from Sag Harbor to Stonington, probably not immediately—although it will eventually be made. There are so many other roads to be made where there are not as great facilities for business as on or about Long Island, that this road will not be made for some years. Chartered in 1832; capital $300,000.

BUFFALO AND BLACK ROCK RAILROAD.—This road is 3 miles in length, constructed with sills hewed on one side, and covered with plank, laid transversely, extending quite across the road, thereby forming a horse path and a covering; upon the plank is laid a white oak scantling, 2 by 4 inches, parallel with and directly over the sills; upon this scantling is laid the iron rail, 2 inches by 1-2 inch. The cost of this road is less than $2,500 per mile. The sills of this road are embedded in the earth, which is rammed hard even with their surface. The road bed is then covered with a coat of lime, with a view of testing its efficacy in preserving the wood-work, which is also to be covered with lime.

UTICA AND SCHENECTADY RAILROAD.—This road was chartered in 1833, with a capital of $2,000,000. Over $14,000,000 were subscribed. It has been surveyed and located. The contracts will soon be let, when operations will commence. The route is a very level one, and well calculated for locomotive power. Its length will be about 100 miles.

RENSSELAER AND SARATOGA RAILROAD.—This road commences and crosses the Hudson at Troy, and passes up on the west side of the river to Waterford; thence to Ballston Springs. The grading is partly completed. Chartered in 1832; capital $300,000.

NEW-YORK AND ERIE RAILROAD.—This road was chartered in 1832, with a capital of 10,000,000 dollars. The charter fixes two points, New-York and Binghamton, and requires it to pass entirely within the state of New-York. Some efforts were made during last season to effect a survey; it was not, however, commenced until the present summer. Judge Wright is now engaged with an efficient force in making the preliminary surveys provided for by a law of the last session of the legislature, and it is understood that the route, as far as examined, is even more favorable than was anticipated. It is believed that the entire route, about 400 miles, may be accomplished with only 2 stationary engines, and that much the greatest part of the road will be found highly favorable for the use of locomotive engines.

The route not having been defined, the delineation on the map is of course merely conjectural.

This road, when constructed, will be to the southern, what the Erie Canal is to the northern part of the state. It will cause flourishing villages to spring up as by magic along its line. It will be intersected from the north by numerous lateral railroads and canals, forming connecting links between it and the Erie Canal and the lakes. Lateral roads will also be made to the bituminous coal regions of Pennsylvania, as well as to the anthracite coal beds, thus furnishing an easy mode of transporting along its entire line, and the lines of its tributaries, that invaluable article of fuel. This road will now, probably, be constructed with all convenient despatch; and when done, a trip to Lake Erie will only be the labor of 30 hours instead of 72 hours, as it *now* is, or of *seven or eight days*, as it was twenty years ago.

DANSVILLE AND ROCHESTER RAILROAD.—Was chartered in 1832, with a capital of $300,000. The road has been surveyed and the stock taken. When completed, it will add much to the business of Rochester, and afford great facilities to the country through which it passes.

This road will probably be continued on to the New-York and Erie Railroad, when that work shall be completed, thus giving ROCHESTER both a water and railroad communication with the southern waters, a water and railroad communication with Buffalo, the same, in time, with Albany, and a railroad to lake Ontario.

MADISON COUNTY RAILROAD.—Commences at Chittenango, on or near the Erie canal, and terminates at Cazenovia. It is also in contemplation to extend this road through De Ruyter to Binghamton, there to connect with the great New-York and Erie road, and also with the Lackawana and Binghamton railroad to the coal region of Pennsylvania, by which the salt works at Salina will be supplied with anthracite coal.

TONEWANDA RAILROAD.—Commences at Rochester, and is designed to pass through Batavia to Attica and Buffalo. Incorporated in 1832. Capital, $500,000.

NEW-YORK AND ALBANY RAILROAD.—This road has not yet been, and probably will not be commenced very soon. It was incorporated in 1832. It is to pass up on the east side of the Hudson River, to Albany. Its capital is $3,000,000. The facilities for river navigation are so great, that this road, for a time, at least, would not be a profitable investment.

BUFFALO AND GENEVA RAILROAD.—Some movements have been made towards obtaining a charter for a railroad between these two points. A railroad will eventually be made over this ground, to connect with a railroad between Geneva and Ithaca, and thence by the Ithaca and Owego, and the New-York and Erie railroad, to the city of New-York.

ITHACA AND GENEVA RAILROAD.—There will probably be a railroad constructed, eventually, to connect the Ithaca and Owego Railroad with another railroad at Geneva, Canandaigua, Buffalo, or Rochester. Chartered in 1832, with a capital of $800,000.

BUFFALO AND ERIE RAILROAD.—To extend from Buffalo, along the Lake, to Erie, Pa. Chartered in 1832; capital $800,000.

SARATOGA AND FORT EDWARD RAILROAD.—This road is designed to be a continuation of the Saratoga and Schenectady road. It was chartered in 1832, and has been surveyed, but its construction has not yet commenced, that I am aware of. Capital $200,000.

SALINA, WATERTOWN, AND OGDENSBURGH RAILROAD.—At present only contemplated. It will, however, be hereafter made, and continued on south, through Tully and Homer, to Binghamton, and become one of the greatest thoroughfares in the country, as upon this

road will pass the immense quantities of anthracite coal to supply the salt works at *Salina*, *Geddes*, and *Liverpool*. Syracuse will not require it except for domestic purposes and mechanical shops, as, for their salt operations, they derive their fuel from a *higher* source, from above,—the main part of the salt manufactured there being by solar evaporation. A road may be made on this line at a comparatively small expense, the route being, except in *Tully*, the dividing ridge between the northern and southern waters, of uncommonly easy grade, with an inclination probably not exceeding 15 feet to the mile, with the *one* exception for a distance of about 1¼ miles, in which an elevation of about 500 feet must be overcome either by *stationary* or *water* power, which latter may be had from the *springs* that issue from the earth a little below its northern declivity, which are now, and may *then* also be used for milling purposes.

This road, when completed, will extend north and south the entire length of the state, and be connected with the St. Lawrence and Lake Ontario on the north, and the New-York and Erie, and Pennsylvania railroads, to New-York and Philadelphia on the south, and Lake Erie on the west, both by the canal, and two lines of railroads, by which the salt, both coarse and fine, will find an immensely extended market.

Catskill and Canajoharie Railroad.—This road was intended to divert a part of the business of the Erie Canal to Catskill. The stock was subscribed, but nothing has been done on the road.

Ausable or Port Kent and Keeseville Railroad.—This road will be 4 1-2 miles in length, with an ascent of 40 feet to the mile. Chartered in 1833; capital $60,000.

Buffalo and Niagara Falls Railroad. }
Niagara Falls and Lockport Railroad. } These two roads were incorporated during the last session of the Legislature. Capital, $110,000 each.

There are several chartered railroads in the state of New-York, of which we only know the title and amount of capital, amongst which are the following:

Names.	*From*	*To*	*Inc*	*Capital.*
Albion and Tonawanda	Albion	Batavia	1832	$250,000
Auburn and Canal	Auburn	Erie Canal	1832	150,000
Aurora and Buffalo	Aurora	Buffalo	1832	300,000
Buffalo and Erie	Buffalo	Erie, Penn.	1832	650,000
Black River Comp'y	Rome	Ogdensburgh	1832	900,000
Dutchess	Po'hkeepsie	Connecticut	1832	600,000
Fish House and Amsterdam	Fish House	Amsterdam	1832	950,000
Hudson and Berkshire	Hudson	Mas. St Line	1832	350,000
Hudson and Delaware	Newburgh	Delaware R.	1830	500,000
Lake Champlain & Ogdensburgh	L. Champl'n	Ogdensburgh	1832	3,000,000
Otsego	Cooperstown	Collierville	1832	200,000
Saratoga Springs & Schuylerville	Saratoga Sp.	Schuylerville	1832	100,000
Schoharie & Otsego	Schoharie co	Susque. Riv.	1832	300,000
Utica and Susquehannah	Utica	Susque. Riv.	1832	1,000,000
Warren County	Glenn's Falls	Warrensb'g	1832	250,000
Watertown & Rome	Rome	Watertown	1832	1,000,000
Whitehall and Rutland	Whitehall	Rutland, Vt	1833	150,000

Paterson Railroad, N. J.—This road will extend, when completed, from Jersey City to Paterson, passing, in its route, Bergen ridge, through which there is a deep cutting of near fifty feet, and much of it through solid rock, two extensive marshes and two navigable rivers. It passes the rivers upon bridges; that over the Hackensack is 1700 feet in length, and upon Col. Long's plan, so constructed with a slide as to permit vessels to pass; the other over the Passaic by a draw. It is constructed in a substantial manner, with cedar sleepers and pine rails, upon which is placed the flat wrought rail, 2 1-2 by 1-2 inch. The first division, from Paterson, 4 miles, to Aquackanonk, was ready for use in the spring of 1832. The second division, to the Newark turnpike, west side of Bergen hill, 1st December, 1833; since when cars have run regularly to that point, from whence the passengers are taken to Jersey City in stages. The fare from New-York to Paterson, 16 miles, including ferriage, is 50 cents, and the route is performed with horse power in two hours. There is much heavy work on the route, especially in deep cuttings and embankments. The deep cutting at Bergen hill is not yet completed, and probably will not be this year, but to facilitate business, and to accommodate the Newark Railroad, which is to be in use this fall, a single and temporary track is laid down over Bergen ridge, which will probably soon be in use to the Hudson river.

New-Jersey Railroad.—This road is to extend from Jersey city, opposite Courtland st. New-York, through Newark and Elizabethtown to New Brunswick. The first 2 1-2 miles from Jersey City, to the west side of Bergen ridge, will be used in common with the Paterson road. This road is now nearly ready for use, and will probably be completed to Elizabethtown this year. It is to be constructed in a permanent manner, and will eventually be a part of the great North and South, or Atlantic Railroad.

Camden and Amboy Railroad.—Extends from South Amboy to Camden, directly opposite Philadelphia. Its course is uncommonly direct. Its curves are few, and generally of a radius exceeding 1,800 feet. On the 1st division, from Camden to Bordentown, 34 1-2 miles, not yet completed, the route is remarkably favorable, mostly level, and seldom has an inclination of 20 feet per mile. The second division, from Bordentown to Amboy, 26 1-2 miles, now in use, is more rugged, having an ascent from Amboy of 45 feet per mile for a short distance. The rails are of rolled iron, 16 feet long, 2 1-8 wide on top, 3 1-4 at bottom, and 3 1-2 inches deep. The neck a half inch thick; weight, 39 3 16 lbs. per yard. They are secured by clamps of iron, and rivetted at the end of each bar. The rails are secured to the stone blocks and sleepers, by means of nails or pins at the sides, driven into wooden plugs. In order to prevent abrasion and concussion, thin slips of wood are put between the rail and the blocks. The *tracks* are 56 1-2 inches wide. Total estimated cost of the road, with a double track, $1,120,322.14, beside real estate, $115,792.84. $180,000 for steamboats, $41,587.65 for locomotives and cars, and $8,674.01 for wharves and piers. This company have obtained the exclusive privilege across the state. A branch is authorised to New-Brunswick. Steam power is used, and the distance from New-York to Philadelphia, 96 miles, is now performed daily in about seven hours.

Philadelphia and Columbia Railroad, Pa.—Leaving the depot at the intersection of Vine and Broad sts. from which various branches pass to different parts of the city, the line extends up the valley of the Schuylkill through Pratt's Garden to the viaduct, a distance of three miles. Various reports, arising from conflicting interests, had been made on the eastern termination of this road, prior to the selection of its present location. The one that has been adopted appears to be the best suited to the nature of the ground, as well as presenting fewer objections than any other of the proposed routes. The viaduct crosses the Schuylkill just below Peter's Island. It is 1045 feet long, 41 feet wide, and 30 feet above the surface of the water. It is built on six piers of hammer dressed masonry, one of which is in 26 feet depth of water; and in addition to a double track of railway, affords ample convenience for both carriages and foot passengers. Immediately succeeding the viaduct, comes the Schuylkill inclined plane, the length of which is 2805 feet, and lifting 1 in 15. At the head of the plane is a steam engine of 60 horse power, with which is to be connected a "fan wheel" and "friction lever," to aid it in passing cars down the plane. By the report of the engineer, it will be found that it will be enabled to pass over 1920 tons for every twelve working hours. The line passes from thence over an undulating surface, requiring heavy excavations and embankments, through portions of Philadelphia, Montgomery, and Delaware counties, till it reaches the viaduct of Valley Creek. The alignement of this part of the road presents numerous curvatures, all of them on radii exceeding the minimum of locomotive power. A flat rail 15 feet long and 2 1-4 by 5-8, laid on two continuous lines of granite sills, well embedded in trenches of broken stone, forms the superstructure of this part of the line. The Valley Creek Viaduct is composed of a wooden superstructure, (Burr's plan,) on abutments and piers of rubble masonry. It is composed of five spans, the aggregate length of which, with the piers, is 592 feet. It is 18 feet wide, and from 35 to 55 feet above the surface of the ground. Immediately beyond the viaduct, the traveller catches the first glimpse of the Great Chester Valley, long esteemed to be one of the most beautiful and fertile sections of the state. At the distance of 21 miles from Philadelphia, the line is intersected by a branch road leading to Westchester, the cost of which was about $85,000 for a single track. At 30 miles, a little to the south of Downingtown, it crosses to the East Brandywine, by a viaduct 465 feet long, and 25 feet high, on a construction similar to that of Valley Creek. Some distance farther, the line crosses the West Brandywine by a viaduct 835 feet long, and 72 feet above the surface of the water, resting on 4 piers of hammer dressed masonry. This viaduct is without a cover, the cars passing in fact over its roof, which is seamed and caulked, like the deck of a vessel. Still ascending the main valley of Chester, the line reaches the summit, which divides it from that of Lancaster. This place is known as the Deep Gap Cut through Mine Hill, and it is believed that for its size there is not another instance in this country of similar difficulties of execution. The cut originally proposed at this place was 37 feet deep and a half mile long, but owing to the discouraging nature of the ground, abounding with slips, springs and quicksands, to counteract the evil effects of which, at the depth proposed, all the efforts of the skilful engineer and enterprising contractors had proved unavailing, and which, if ever counteracted, would have most probably cost over $300,000,—it became necessary, in order to diminish the cutting, to raise the grade, which hitherto had seldom exceeded 30 feet per mile to 45 feet, and even now, though at only 8 or 10 feet deep, it required heavy piling and substantial platforms before the road could be carried through. Thence descending the Lancaster valley, the road crosses the Pequa, by a viaduct 150 feet long and 24 feet high, and soon after, Mill Creek, by a similar construction, 550 feet long and 40 feet high. Thence it follows the general features of the country till it reaches the immense viaduct over Conestoga River. The piers are of rubble work, 60 feet above the surface of the water, the whole length of the platform being 1412. To economize in the width of the structure beyond that necessary for strength, only three lines of rails have been laid, giving all the convenience of a double, without the inconveniences of a short curve, and two switches rendered necessary by a single track. Not long after, the line enters Lancaster by a high embankment, the materials of which were obtained from the deep rock cutting in the town. The location, as well as the grade of the road, has been materially changed from that originally intended, the extra expense of which was defrayed by the town, in consideration of the advantages it thereby gained. From Lancaster the line passes through a beautiful section of the county of the same name, presenting no very great irregularities of profile, or difficulties of construction other than the viaduct over the Little Conestoga, 804 feet long and 47 feet high, not long after which it arrives at the summit of the Columbia inclined plane. The view that here presents itself of the broad and noble Susquehannah, covered with arks and vessels bearing the varied products of the North and West, and spanned with its magnificent bridge of more than thirty arches, and a mile and a quarter long, is such as amply to repay one for the day's journey over this "iron avenue to the West." The Columbia plane is 1800 feet long, with a rise of 1 in 20. The engine is of 40 horse power, which, taken in reference to the plane, is of the same capacity as that of the Schuylkill. From the plane the line passes through Columbia to the basin of the eastern division of the Pennsylvania Canal. Examinations and estimates have been made in relation to joining the line with the bridge, which have resulted in the proposition of an inclined plane, with horse power, running at right angles to the line of the bridge, and communicating with it by means of revolving platforms. The construction of this road was authorized by the Legislature in 1828, but owing to a delay in the appropriations, it is not yet finished, but there is every probability of its being completed by January, 1835. On the first ten miles the construction has already been described; on the remaining 72, the Clarence or Wiggan rail and chair has been adopted, to be laid on stone blocks and locust sills. The sill is so disposed as to be at every 15 feet lineal on the straight line, and every 9 feet on the curves. The blocks and sills to be laid in trenches of broken stone, well rammed. On the newly formed embankments a superstructure of wood has been adopted in preference to the stone, on account of its easier adjustment. The cost of the whole line, when completed for locomotive power, including the cost of all engines, will be $3,595,809 98, or about $43,851 per mile.

Alleghany Portage Railroad.—This line commences at Hollidaysburg, the termination of the eastern division of the Pennsylvania canal, and passing up the rugged ravine of the Juniata, crosses the Allegany mountain at the Blair's Gap Summit, thence it descends the valley of the mountain branch of the Conemaugh, till its final termination at Johnstown, where it intersects the western division of the canal, being a total distance of 36.69 miles, overcoming in ascent and descent an aggregate of 2570 feet, 1398 of which is on the eastern, and 1172 on the western side of the mountain. The design of this road was to effect a communication between the two divisions of the canal, thus completing the "main line" between the cities of Philadelphia and Pittsburg. It was originally intended to continue the canals by means of numerous locks and dams, as far as possible, on both sides, and then to tunnel through the summit, a distance of over four miles. Luckily, however, for her resources and time, the state of Pennsylvania, by a vote of her Legislature, abandoned this extravagant idea, and determined on the construction of a railroad.

Surveys in relation to this latter project were made as early as 1828, and continued year after year by different engineers, till the final appointment of Sylvester Welsh, under whom its present location was made, and its construction brought to a successful termination. The structures on this line exceed, in their size, beauty and utility, any thing of the kind in this country. 2007 feet of ascent and descent has been overcome by 10 inclined planes, lifting variously from 150 up to 307 feet, and varying in inclination from 4 deg. 8 min. 48 sec. up to 5 deg. 51 min. 9 sec. There is also on this line a tunnel 870 feet long and 20 feet high, through the Staple bend of the Conemaugh, arched for 160 feet from each end. All the viaducts and bridges have been built of the most substantial mortared masonry, the character of which is in perfect keeping with the nature of the place. The principal viaduct on the line is that over the Horse-Shoe Bend. It is a single semicircular arch, of 80 feet span, and a total height of structure above the surface of the water of 85 feet, and costing $54,-562. The Ebensburg and Mountain Branch viaducts, 40 feet span each, may also be named as among the principal structures. The whole number of culverts laid in mortar is 68. The plan of road structure is one of the greatest strength and stability, answering to the importance of the line. It consists of the Clarence rail, weighing 41 pounds to the yard—the chairs of which are placed on stone blocks of 3 cubic feet each. The total cost of the road when completed will be $1,526,029 42. The whole line will be finished by the end of the present year.

PHILADELPHIA, GERMANTOWN, AND NORRISTOWN RAILROAD.—The act of incorporation of this company was granted by the Legislature of the state of Pennsylvania in the winter of 1830–31; and the preliminary surveys for the final location of the line commenced early in the spring, and the work was put under contract, and commenced in July of the same year. The line as now constructed to Germantown leaves the corner of Ninth and Spring Garden streets in Philadelphia, and soon after enters the valley of Cohocsing, which stream it crosses by a handsome viaduct of mortared rubble, in one arch of 20 feet span, and a total height of structure of 25 feet. Curving there to the left, it passes up the valley of the Cohocsing, crossing the Germantown road by a skewed viaduct, on Town's plan, of 73 ft. span, on abutments of cut stone mortared masonry. Thence through a summit it joins the valley of Fisher's Run, up which it ascends, crossing Fisher's Lane by an arch of 33 ft. span, and 24 ft. high, of rubble masonry, and immediately after reaches Welley's Factory, where it ceases. The original location was based upon the necessity of passing through Germantown, thereby rendering the construction of the line liable to extremely heavy excavations and embankments, and a bridge over the Wissahiccon more than 100 feet high. This line, by a special act of the Legislature, the company has been enabled to abandon entirely, and are constructing the road anew, branching off at Weiss's Tavern, and immediately after gaining the valley of the Schuylkill, up which it will proceed by easy grades and light work to Norristown. The grades on the part now constructed vary from a level up to 32 feet per mile, the alignement of which consists of numerous curves, on radii of from 700 to 3,500 feet. The superstructure consists of a Clarence rail and chair, fastened by means of a screw and nut to stone blocks. The graded surface is 25 feet, on which a double track has been laid for the whole distance to Germantown. The highest embankment is 18 feet, and the deepest excavation is 17 feet, and yet the road has already cost the enormous sum of $250,000! or a little more than $41,000 per mile.

THE WEST CHESTER RAILROAD.—Is a branch from the Philadelphia railroad to the flourishing village of West Chester. It unites with the Pennsylvania railroad on the South Valley Hill, two miles west of Paoli. It is the property of a company composed of enterprizing citizens of Philadelphia and West Chester. Length, nine miles; cost about $100,000. Completed, and now in use.

LITTLE SCHUYLKILL RAILROAD.—From Port Clinton, at the mouth of Little Schuylkill, to the village of Tamaqua, on that stream—distance 21 1-2 miles, with several branches to coal mines. This is the work of a company, and is designed principally to transport coal to the Schuylkill navigation. Finished, and in use.

MINE HILL AND SCHUYLKILL HAVEN.—At the mouth of the West Branch of Schuylkill, up that stream 10 1-2 miles, to Mine Hill Gap. Finished and in use. Trade, coal. Belongs to a company.

MOUNT CARBON RAILROAD.—From Mount Carbon, one mile below Pottsville, up the valley of the Norwegian creek; main line and branches, about seven miles. Finished and in use. Trade, coal. Belongs to a company.

DANVILLE AND POTTSVILLE RAILROAD.—From Pottsville to Sunbury, opposite the forks of the Susquehannah. Length, 45 miles; eight miles nearly completed. It is designed to accommodate the great coal region on the Shamokin, Mahoney, &c., and to connect the Susquehannah with the Schuylkill canal. Belongs to a company.

SCHUYLKILL VALLEY RAILROAD.—From Port Carbon, at the head of Schuylkill navigation, up that river to the town of Tuscarora—distance 10 miles. Trade, coal. Belongs to a company. Finished, and in use.

THE MAUCH CHUNK RAILROAD.—The first of any magnitude completed in the United States. From the head of the Lehigh Canal, at Mauch Chunk, to the coal mine on the summit of Mauch Chunk mountain. Aggregate of main line and branches, 12 3-4 miles. Belongs to the Lehigh Coal and Navigation Company.

THE ROAN RUN RAILROAD.—From Mauch Chunk, up the Lehigh, to a coal mine—length, 5 1-4 miles. Finished, and in use. Belongs to the above company.

LYKEN'S VALLEY RAILROAD.—From Millersburgh on the Susquehannah, up Lyken's Valley, to a Coal Basin in the Brody Mountain. Distance, 16 1-2 miles. Began, and completed in 1833.

CARBONDALE RAILROAD.—Belongs to the Hudson and Delaware Canal Company, and connects that work with the Coal Mines in the valley of the Lackawana. Length of road, 16 1-4 miles. Finished and in use.

DELAWARE AND SUSQUEHANNAH RAILROAD.—This road is designed to extend from Elizabethtown, N. J., by the way of Somerville to Belvidere, thence through the Lackawana coal region to Pittston, on the Susquehannah. It has been chartered both in New Jersey and Pennsylvania, and the route has been surveyed, but the work has not been commenced.

PHILADELPHIA AND TRENTON RAILROAD.—This road extends from Philadelphia to Trenton, N. J., along the Delaware, and but for the charter of the Camden and Amboy railroad, which secures the exclusive privilege of a railroad across the state, it would be continued to New-Brunswick, there to unite with the New-Jersey railroad to New-York, and thus form a continuous railroad between the two cities. Distance, 27 1-2 miles, which will be completed in a few weeks, when there will be, with the exception of the 25 miles from New-Brunswick to Trenton, N. J., a railroad completed or under contract, from New-York to Washington city, and to Winchester, Virginia, from Baltimore.

LACKAWANA, PA.., AND BINGHAMTON, N. Y., RAILROAD.—Contemplated to connect the Delaware and Susquehannah railroad with the New-York and Erie, and with the Salina and Binghamton railroad, and the Chenango Canal at Binghamton, thereby opening the coal region of Pennsylvania to the interior of New-York. This route has been explored, but not chartered, or rather not located yet.

PITTSTON, PA., AND CHEMUNG, N. Y., RAILROAD.—Also contemplated to open a communication with the interior of New-York by the Chemung Canal, and also a direct communication between the bituminous coal region of Tioga, with New-York.

WILLIAMSPORT, PA., AND ELMIRA, N. Y., RAILROAD.—A third route from the interior of Pa. to the interior of New-York. This road was chartered in 1832. The route has been surveyed, but I am not informed what progress, if any, has been made with the work.

PHILADELPHIA AND BALTIMORE RAILROAD.—This road will form a connecting link between the Pennsylvania and Maryland railroads. It diverges from the Pennsylvania, or Columbia Railroad, 45 1-2 miles from Philadelphia, passes through Oxford, and will strike the Susquehannah about half a mile above Port Deposit. Its length will be 20 1-4 miles, within the state of Pennsylvania, and 11 miles in Maryland, without even a bridge or a culvert. The ground is highly favorable for a railroad, which, with a double track of wood superstructure and flat rails, is estimated to cost $12,030 per mile. The grade of the road is favorable, having only in one place an inclination over 30 feet per mile, where it is 44 feet per mile. The curves are on radii of 1000 feet and over.

The above list is believed to comprise all the important railroads in Pennsylvania, actually finished, or upon which arrangements have been made for their early completion. Some smaller or branch lines have been probably overlooked.

NEWCASTLE AND FRENCHTOWN RAILROAD, Delaware—This road is considered by many as one of the best in the country. It was commenced at an early day, and was in use nearly through its entire line on the 1st of April, 1832, yet we have never received any particular report, or information, as to its cost, &c., &c. Its length is 16 miles, from Newcastle, on the Delaware, to Frenchtown, on the Chesapeake. It is said to be constructed in a superior manner. Locomotive power is used, for which its grade and curves are highly favorable. The route is performed with great ease in 50 minutes.

BALTIMORE AND OHIO RAILROAD.—This road was chartered in 1827, with a capital of $6,000,000. The grand object of this road was to open a direct and easy communication from Baltimore to the always navigable waters of the Ohio, at Wheeling, or some other suitable place. The work was commenced July 4, 1828, yet very little was done until October of that year. The first division of the road has been constructed, on account of the unfavorable topography of the country, at great expense. There are some very heavy excavations and embankments, and expensive viaducts. The graduation alone of the first 13 miles cost over $381,000, or over $29,000 per mile, and the masonry on the same section cost $17,160 64 per mile; whilst the remaining 58 miles cost only at the average rate of $8,913 38 per mile. There are 35 bridges and viaducts on this road, some of which have been built at great expense. Among these are the Carrolton, the Paterson, and the Monocacy bridges.

This road is constructed upon various plans, as follows: 33.8 miles of single track on stone sills, at an expense of $7602 87 per mile for the superstructure; 5.8 miles, with wood strings on stone blocks at $5457 51 per mile, and 89.5 miles on wood sleepers and strings, or rails, at $4,426 81 per mile. Although it was always designed to push this road over the mountain, yet its precise route or termination has not been defined, and we are therefore unable to speak with accuracy upon the subject.

This road was arrested in its progress for a length of time, by coming in contact with the Chesapeake and Ohio Canal. A settlement was made, however, and it is again progressing towards Harper's Ferry. It has been in successful operation from the Point of Rocks for more than a year. The enterprise of this company has done much toward disseminating a spirit for improvement in other states. It has been visited by those interested in similar works, from all sections of the country, who have returned and carried with them information which enables them to diffuse amongst their neighbors a spirit which will produce, eventually, the most beneficial results. It is much to be desired that this work should be continued on to its intended termination, the Ohio River. (See Railroad Journal, vol. i. p. 657.)

BALTIMORE AND WASHINGTON RAILROAD.—This road is to connect with the Baltimore and Ohio railroad, 8 miles from Baltimore, and is, in fact, an appendage to that great work. It will be about 32 miles in length, exclusive of the Baltimore and Ohio, and is estimated to cost about $1,500,000. The distance from Baltimore to Washington is 40 miles, which it is contemplated to run with locomotives in two hours.

PETERSBURG AND ROANOKE RAILROAD.—This road was chartered in 1830, with a capital of $400,000. It commences at Petersburg, and terminates 1 1-2 miles below the falls of the Roanoke, and is 59 miles in length, a distance of 3 1-8 miles only greater than a straight line. Its curves are mostly on radii of 2 to 9 miles, and after leaving Petersburg it has in no place a greater inclination than 30 feet per mile. It is said to be one of the best built and best managed railroads in the country. The graduation of the road and masonry of the bridges, culverts, and other constructions, are of the most permanent kind. The superstructure is of white oak sills, 12 inches in diameter, heart yellow pine rails, 5 by 9 inches, plated with iron, 1-2 inch by 2 inches wide. One-half of the road was opened for use in October, 1832. The remaining part, or to within a few hundred feet of the Roanoke, was completed and used in August, 1833. Locomotive engines are used to great advantage on this road. It will probably be continued on to Raleigh and Fayetteville, N. C., as soon as that state becomes sufficiently aroused to undertake so much in addition to those in contemplation from the sea coast to the interior.

PORTSMOUTH AND ROANOKE RAILROAD, Virginia.—Commences at the town of Portsmouth, opposite Norfolk, and passes through Suffolk, over a very level country, 77 miles, being only half a mile farther than a direct line. It crosses the Petersburg Railroad,

and terminates at the north bank of the Roanoke river, opposite Weldon, in North Carolina. The greatest inclination is only 20 feet per mile, and 5730 feet is the smallest radius. This road is estimated to cost $475,000. The surveys have been completed, and the work is now in use between Portsmouth and Suffolk. This road, when completed, will compete with the Petersburg and Roanoke Railroad. It will draw much of the up-country trade direct to Norfolk, instead of its taking the more circuitous route by Petersburg.

Winchester and Potomac Railroad.—This road was chartered in 1831, or '32. It was put under contract in November, 1833, with fair prospects of early completion. It will connect with the Baltimore and Ohio Railroad at Harper's Ferry, and at no distant day be continued south through the Valley of Virginia, and probably either continued on to Knoxville, in Tennessee, or follow New and Kanawha rivers to the Ohio. It is *impossible* to arrest the spirit of internal improvement, especially in a section of country that has so many natural advantages as Virginia. Her wealth in minerals, water power, and resources for enriching her soil, are not duly appreciated by her citizens. They are, however, becoming so, as will ere long be seen. There is good reason to believe that her mineral resources are equal, if not superior, to any other state in the Union.

Richmond, Fredericksburg, and Potomac Creek Railroad.—The citizens of Richmond and Fredericksburg have made some considerable effort to make a railroad from the Potomac to Richmond. The distance is about 70 miles; the country level; the present roads, especially in the wet season, as bad as need be. Present appearances are favorable to the progress of the work, as a party of engineers are at this time (July, 1834,) engaged upon it. Should it be made, and also continued to Petersburg, Virginia will have done her share towards completing the great line through the Atlantic States, as connected with steamboat navigation.

Atlantic and Ohio, or James and Kanawha Railroad.—A work second to no other in the South, and yet scarcely agitated at the present time. The contemplated railroad from York, or Elizabeth river, on the Chesapeake Bay, up James river to the valley, and up the valley to New River, and thence down that and the Kanawha, or in its vicinity, to the Ohio river, must eventually be constructed; and, when *properly* constructed, Virginia may again look for commerce within her limits. Such a work *will be* constructed, and it only remains for the present generation to decide whether they will enjoy its benefits or leave them for the next. *Talking* and *resolving* will not construct canals and railroads: they must also act.

North Carolina or Central Railroad—commences at Newbern, and will probably follow the course of the Neuse River to Raleigh, and from thence across the country to or near Clinton, on the Yadkin, and thence to or near Statesville, Morganton and Ashville, and thence down the valley of the French Broad River to Knoxville, Tenn. This is a work of magnitude, and of great consequence to the prosperity of North Carolina, and it is much to be desired that it should be prosecuted with vigor. The present prospects of the road are flattering. A convention was held at Raleigh on the 4th of July, 1833, at which 118 delegates attended, and over which his excellency Governor Swan presided. Great unanimity of sentiment prevailed, and it is to be desired that the work may be undertaken in a proper spirit, and then prosecuted with vigor. There is no Atlantic state in the Union, perhaps, which will be more benefitted by such a work than North Carolina.

Cape Fear and Yadkin Railroad.—This road commences at Wilmington on the navigable waters of Cape Fear River, and follows the direction of that river to Fayetteville, and from thence probably to Clinton, on the Yadkin River, in the county of Davidson, at which place it unites, or it is to be hoped it will unite, with the Central Railroad from Newbern through Raleigh. From this point, should the road be continued further, as it *undoubtedly* will, if the citizens of North Carolina duly appreciate their location, the natural advantages they enjoy, and their mineral wealth, it will probably pass through Morganton, in Burke, to Ashville, in Buncomb county, and from thence it will follow the French Broad river, to Knoxville, in Tennessee, where it will connect with the great road through the valley of Virginia to Richmond and Baltimore, and New-York, and Boston. North Carolina has much at stake in the prosecution of this work. She must make it in self-defence, if for no other reason. With the railroads of South Carolina and Georgia on the south, and Virginia and Maryland on the north, she will be lost in her own nothingness, unless she steps in and intercepts a share of the business which must pass to the Atlantic; and with her *Central*, and *Cape Fear* and *Yadkin* railroads, united at Clinton and extended to Knoxville, she may successfully compete with her neighbors: without them, she is lost. This road was commenced at Fayetteville on the 15th June.

Roanoke, Raleigh, and Fayetteville Railroad.—This road is to be a continuation of the Petersburg, or rather the great north and south railroad through the Atlantic States to the Mississippi.

South Carolina, or Charleston and Hamburgh Railroad.—The city of Charleston, or some of her enterprising citizens, are entitled to great credit for the construction of this work. It was the first work of the kind commenced in the southern states. As early as February, 1828, measures were taken to ascertain what would probably be the effects of such a work upon the general interests of Charleston. The result was an application for, and the granting of, a charter. The work was commenced in the winter of 1829 and '30, and has been continued with great perseverance, until its final completion in Sept. last, since when it has been in successful operation. The manner of constructing this road, of wood on piles, and in many cases on *trestle work*, does not please every one, but it was probably the only mode, a cheap one, which could at the time have been adopted. Its length is 135 miles, the longest railroad ever constructed. It rises 510 feet from Charleston, and then from this point, 16 miles from Hamburgh, descends 360 feet to Augusta Bridge. There is an inclined plane of 3800 feet in length, with a descent of 180 feet. It has three grades of descent, the steepest of which is one in thirteen. From the foot of the plane, the remainder of the descent is overcome in 10 miles with an average inclination of 18 feet per mile. The road is a single track, with necessary turnouts, except at the inclined plane, where there is one mile of double track. At the inclined plane there is a stationary power of two twenty-five horse power engines working on one crank. Locomotive power is used on the road. It has cost, including motive power, cars, and every thing complete, ready for use, $904,499, or $6,625 92 per mile. This road will be continued, or rather the Georgia Railroad will connect with this, and pass through Athens, and thence westward, and connect with the Tuscumbia and Decatur, and the Tennessee Railroad, to the Mississippi River, thus forming one of the most important works in the Union.

The route from Charleston to Hamburgh, 135 miles, is performed in less than twelve hours with great ease, and *will* be done in eight hours.

Cheraw, Camden, and Columbia Railroad.—This road will probably be constructed within a few years as a connection between the great Atlantic Railroad, from the north, and the road from Augusta through Georgia and Alabama, to the Mississippi. It will probably intersect the Charleston and Hamburgh road at some point about one hundred miles from Charleston, and 35 miles from Hamburgh.

Augusta and Athens (Geo.) Railroad.—Sir: As you request an account of the Georgia Railroad, I give it cheerfully, so far as the project has gone. And first, as to the route, I refer you to Tanner's Map of the United States. We begin at Augusta, go down the Savannah River to Butler's Creek, up the valley of that creek, and gradually ascend the ridge between the head waters of Bear Creek, on the left, and Little River on the right. We pass a little to the north of Warrenton, directly through Crawfordville, seven miles north of Greenesboro,' a little west of Lexington, and cross the Oconee river at Athens. After ascending out of the valley of Butler's Creek, there is a continuous ridge the whole way until we come opposite Athens. The valley of the Oconee is deep, but it can be overcome by an inclined plane and stationary power, at a moderate expense, or by a viaduct, which last mode seems to be preferred by Col. Long.

Referring to the same map, we propose to cross the Middle Oconee, with the route beyond Athens, near Clarksboro'. Thence there is another ridge, of remarkable evenness of outline, passing round the head waters of the Ocmulgee, a little north of Lawrenceville, to the Chattahoochee. Crossing that river we find another ridge, between the head waters of Tallapoosa on the south, and the Etowah on the north. We propose to cross the Coosa near the mouth of Will's Creek, perhaps higher up, and proceed, by a route yet to be ascertained, but practicable, by all accounts we have of the country, to connect with the Tuscumbia and Decatur railroad, (Ala.,) at the last mentioned place. From Tuscumbia to Memphis, the country is now under examination; and will, we are informed, present no serious obstacle to the construction of a railroad. Col. Long, of the United States Engineer Department, is now engaged, (July, 1834,) in examining the route between Athens and Decatur.

You have here a sketch of the route which it is proposed to pursue in connecting the Mississippi with Charleston. It differs from what you had supposed to be the route, from the circumstance that, in this region, we find it best to keep on the ridges, instead of pursuing the valleys of our streams.

The charter of the Georgia Railroad Company is a very liberal one. It gives us the exclusive right to an extent of 20 miles on each side of our road. But we have no fears of competition, even without this exclusive right; for nature has settled that question. We have two years to begin our work in, and six to finish it; and our charter runs for thirty-six years after the completion of the road, so far as respects the exclusive privilege—but the corporation is perpetual.

We are authorized to charge 50 cents per 100 lbs. for 100 miles freight; and 10 cents per cubic foot for articles of measurement the same distance; and 5 cents per mile for passengers.

The whole amount of stock is one million five hundred thousand dollars. Stockholders are entitled to a vote for every share they may hold; and the stock of the company is exempt from taxation; but seven years after the road is finished, the net profits *may* be taxed, not exceeding *one-half* of one per cent. per annum.

The distance from Augusta to Athens is, by the road now travelled, 96 miles. By the survey for the railroad, the distance is increased to 114 miles. The estimate is, that the road will cost, complete, about 10,000 dollars per mile. But many persons who are well acquainted with the facilities of the country through which the road will pass, think this estimate quite too large. Even at ten thousand dollars per mile, the investment must be a good one. Between fifty and seventy thousand bales of cotton must pass over the road annually; and the return freight will consist of the articles consumed by at least two hundred thousand people. Then add travelling, and the transportation of the mail; and to all this the amount of new business that always springs up where the facilities of transportation are increased. Our iron, marble, and limestone, of which we have an ample abundance of excellent quality, though now almost entirely useless as articles of export, and even of domestic consumption, will be called into requisition; and these will add something very considerable to the income of the road.

Our calculations are, that this road, even if it should go no further west than Athens, will receive a large share of business from East Tennessee. At present, they receive a great portion of their goods in that region by land from Baltimore, paying from five to eight cents per pound freight. By Charleston, Augusta, and Athens, they can receive the same goods at 3 1-2 cents per pound. They will not hesitate, therefore, we think, in their choice of routes.

But if this road has so good prospects, supposing it to stop at Athens, what must they be if it be pushed through to the valley of the Mississippi? In that event, we are confident that no stock in the world will be equal to it in the amount of its annual returns in the shape of profit.

Our charter provides for the construction of two branch roads, leaving the main road at the most advantageous point near Greenesboro,' and running, one to Eatonton, and the other to Madison, Morgan county. If, on due examination, it be found practicable to construct these roads, a very large proportion of the whole cotton crop of Georgia must pass over the Georgia Railroad.

The people of Savannah, with praiseworthy enterprise, propose to construct a railroad from that city to Macon. We believe it is the true interest of the people of that city to direct their attention to a connection with the Georgia Railroad at Augusta. The trade, which would otherwise go to Charleston, may be thus intercepted for the benefit of Savannah; and the people of the interior, when they reach Augusta, having a choice of markets, can go either to Savannah or to Charleston, as may best suit their interest.

Yours, respectfully, C.

Savannah and Augusta Railroad.—A railroad is in contemplation between Savannah and Augusta, Georgia, with a view of securing a share of the business of the state. It is indeed highly essential for Savannah to make an effort of this kind, or she will lose almost the entire trade of the up country. With this road she may share with Charleston the business.

Tuscumbia, Courtland, and Decatur, Alabama, Railroad.—This railroad, the first undertaken in the far South, (except perhaps the Pontchartrain and

New-Orleans Railroad,) was commenced in 1831, and more than 15 miles of it are now in operation; it will be 45 2-5 miles in length when completed, and will probably be ready for use by the 1st of October, 1834. It has wood rails, resting on cedar sleepers, upon which is placed a flat wrought iron rail. Its greatest ascent is 28 feet per mile, and it has but one curve, with a less radius than 1,512 feet, which is 1,380 feet. This road is designed as a link in the great chain of railroad from the Mississippi, to and through the Atlantic States, and it will be intersected by numerous other roads, both from Alabama and Tennessee. It is estimated to cost about 10,000 dollars per mile when completed.

MOBILE AND MONTGOMERY RAILROAD. }
MOBILE AND TUSCALOOSA RAILROAD. } There probably will be a railroad constructed from Mobile to each of these places, by way of retaining the business of the state.

TUSCALOOSA AND DECATUR RAILROAD.—A railroad is contemplated between Tuscaloosa and Decatur.

MONTGOMERY RAILROAD.—Some movements have been made for constructing a railroad from Montgomery, Alabama, to some point on the Tennessee river, probably at Decatur.

PULASKI, TENNESSEE, AND FLORENCE, ALABAMA, RAILROAD.—The route for this road has been surveyed, the stock taken, and the directors elected It is to be commenced this fall at both ends, and will be, when completed, 59 1-2 miles in length.

ELKTON, TENNESSEE, ATHENS AND DECATUR, ALABAMA, RAILROAD.—A railroad is contemplated from Elkton, Tennessee, through Athens, to intersect the Tuscumbia, Courtland, and Decatur Railroad, probably at Decatur.

COLUMBIA AND TENNESSEE RIVER RAILROAD.—The route for this road has been surveyed, and the estimates of its cost made. (See Railroad Journal, vol. 3, p. 334.) It commences at Columbia, and passes in a south-westerly direction, crossing the Big and Little Buffalo rivers, to or near Waynesboro', and thence to a suitable point on the Tennessee river, between Ellis's Ferry, and Roche's Farm, from whence it will probably be continued to Bolivar, or Jackson, and thence to the Mississippi river at Memphis, or near Covington. The distance from Columbia to the Tennessee is about 50 miles, and its estimated cost, on the plan of the Charleston and Hamburgh railroad, is about $360,000. Five routes have been surveyed, varying from 57 to 65 miles, and from $374,970, to $441,450.

MEMPHIS AND BOLIVAR (TENN.) RAILROAD.—This railroad will be the final link in the grand Atlantic Railroad. It has been surveyed, and it is much to be hoped that its construction will be commenced without unnecessary delay. Let this be commenced, and the intermediate sections between Bolivar and Tuscumbia; and Decatur and Athens, Georgia, will speedily follow. It is designed also to connect this road with another, via Waynesboro', to COLUMBIA and NASHVILLE, and finally to continue it to LOUISVILLE, Kentucky.

JACKSON (TENN.) AND MISSISSIPPI RIVER RAILROAD.—This road is to commence at the village of Jackson, Tennessee, and terminate at one of the following places, as may be most suitable on the Mississippi, viz., Randolph, Fulton, Coal Creek, or Ashport. Its length will vary little, according to the surveys, from 58 miles, and its cost, the road to be made similar to the South Carolina road, is estimated, including every convenience for business, and to be completed early in 1837, at $337,052,50, and its income, based upon the present business of the country, at $100,500, its expenses at $19,350, leaving a net income, per annum, of $81,150, to divide among the stockholders.

This road will probably be continued to Columbia, either by the way of Bolivar, or to intersect in a more direct course the Columbia road, at its crossing of the Tennessee. The Columbia road will also probably be connected with Tuscumbia, or Decatur, by the way of Pulaski, Elkton, and Athens. There appears to be a suitable spirit aroused in Tennessee upon this subject, and important results must follow. The vast resources of the State will be developed, and its mineral wealth will be enjoyed by those who now possess them, instead of being wholly reserved for succeeding generations.

COLUMBIA AND NASHVILLE (TENN.) RAILROAD.—The same enterprise which projected the railroads already mentioned will soon extend them to other parts of the State, and amongst the first, as has been suggested, will probably be one from Columbia to Nashville, the capital of the State; and it has been also timated that it was in contemplation to extend it to Louisville, Kentucky, thereby opening a choice of routes, either to New-Orleans, New-York, via the Lakes, or Charleston, S. C.

NEW-ORLEANS AND PONTCHARTRAIN RAILROAD.—This road extends from the city of New-Orleans to Lake Pontchartrain, about 6 miles, and is designed as a link in the route to Mobile by steamboat. The road, machinery, real estate in the city and harbor on the lake, (which last, by the by, must have cost the largest proportion of the amount,) have cost $443,443 76. It has been in use for passengers since the spring of 1832, and from the 23d of April to 23d October of that year, $36,000 were received for passengers alone, which, after deducting expenses, gave a net income of $25,000. It will materially reduce the expense of transportation between Mobile and New-Orleans.

TALLAHASSEE (FA.) AND ST. MARKS RAILROAD.—Something has been done towards a railroad from Tallahassee to some point on the St. Marks, or Wakulla river. 900 shares were subscribed, and application was to have been made to Congress, at the last session, for a charter.

WEST FELICIANA AND WOODVILLE RAILROAD.—This road commences at St. Francisville, on the east bank of the Mississippi river, and extends in a northerly direction to Woodville, in Mississippi. Its length is 30 miles. It was to have been commenced in December, 1832, and to have been completed in 1833. Of its progress and present condition, no definite information has been received.

VICKSBURG AND CLINTON (MISS.) RAILROAD.—In March, 1832, a meeting was held at Hamburgh, Miss., for the purpose of taking measures to construct a railroad from Vicksburg to Clinton. Of the result of that meeting no information has been received.

LEXINGTON AND OHIO RAILROAD.—This road, commencing at Lexington, passes through Frankfort and terminates at Louisville, Ky. It will be, when completed, 90 miles in length. That part between Lexington and Frankfort, 29 miles, has been completed at an expense, including machinery, of $400,000, and is now in use. The construction of this road is said to be equal to any, and superior to most other railroads in this country; it has no curve with a less radius than 1000 feet. The remaining 61 miles of the road will probably be completed for $500,000, or about $8200 per mile. Should it be completed in the same permanent manner with that now in use, it will do credit to the State, and to those who have had the superintendence of it. At present horse power only is used.

MAD RIVER RAILROAD.—This road is designed to extend from Dayton, the present termination of the Miami canal, to Sandusky, on Lake Erie. It will pass through a very fertile section of the State, and open a direct and convenient communication from the Lake to Cincinnati and the lower Ohio. It will be, when completed, 153 miles in length. It passes in its route the villages of Springfield, Urbana, Bellefontain, Upper Sandusky, and Tiffin.

It is estimated to cost $11,000 per mile.' The route is said to be remarkably adapted to the use of locomotive power, as there is not an elevation on the line which would require the aid either of animal or stationary power. It will probably be made in a few years.

The other chartered railroads in Ohio are the following, some of which will probably be completed, whilst others will be railroads on the statute-books only. We have received no intimation that either of them has been, or is likely to be made immediately.

THE ERIE AND OHIO RAILROAD will pass from the Lake, at Ashtabula, or Fairport, through Warren, to Wellsville, on the Ohio river, a distance of about ninety miles, and perhaps the shortest route by which the two can be connected.

THE PENNSYLVANIA AND OHIO RAILROAD is designed to open an easy communication from the Ohio Canal at Massillon with Pittsburg, passing through the valley of the Little Beaver river to the Ohio; by which it is hoped to divert to Philadelphia much of the trade which would otherwise go to New-York.

THE CHILICOTHE AND LEBANON RAILROAD will open a communication from Chilicothe through Hillsborough, Wilmington, and Lebanon, probably to the Miami canal.

THE RICHMOND, EATON, AND MIAMI RAILROAD is, we believe, to commence at Dayton, at the head of the Miami Canal, and pass through Eaton, in Preble county, to Richmond, in Indiana.

THE CINCINNATI, HARRISON, AND INDIANAPOLIS RAILROAD will open an easy communication from Cincinnati through Harrison and Brookville, in Indiana, to the seat of government in that state, there to connect with the Madison, Indianapolis, and Lafayette railroad, incorporated by the Legislature of Indiana.

THE FRANKLIN, SPRINGBOROUGH, AND WILMINGTON RAILROAD is nearly a parallel road to the Chilicothe and Lebanon railroad; which we should suppose would be made to intersect at Lebanon, and thereby insure the construction of one *good* one, rather than defeat the whole.

THE MILAN AND NEWARK RAILROAD is designed to open a direct communication from the Ohio Canal at Newark, in Licking county, with Lake Erie, passing through Knox, Richmond, and Huron counties—probably to the mouth of Huron river. This road will pass through a beautiful section of country, and will run nearly parallel to and not far from the Milan and Columbus railroad, as we infer from the *title*—from which indeed we have traced the course of most of these roads, not having received the different acts by which they are chartered.

The last mentioned road, from Columbus to Milan, and the Columbus, Delaware, Marion, and Sandusky Railroad, will pass through that section of country included between the railroad from Newark to Lake Erie and the Mad River railroad, passing through Urbana, in Champaign county, to Sandusky; which can in no place exceed seventy miles in breadth.

INDIANA RAILROAD.—This road is to commence at Madison, on the Ohio River, and pass through Indianapolis to La Fayette, on the Wabash River, a little below the termination of the Wabash and Miami Canal, and from La Fayette it is to be continued to the Lake, at Michigan. This road, when completed, will afford an easy mode of communication between the Lakes and the Ohio. The company has ten years to complete the road to Indianapolis, and five years thereafter to complete it to La Fayette

DETROIT (MI.) AND ST. JOSEPHS RAILROAD.—We know of no movement for this road, or the one from Monroe, but take it for granted that railroads *will* be, for the very good reason that they *should* be, constructed at an early day from these two points to the mouth of the St. Josephs River, there to connect with a line of steamboats for Chicago, or by a railroad around the lake, if the people of Illinois decide upon a railroad from Chicago to the rapids of the Illinois, instead of a *ship* or *steamboat canal*.

LIST OF CANALS.

CUMBERLAND AND OXFORD CANAL, MAINE.—This canal, so called from the two counties through which it and its tributaries pass, is the only work of internal improvement of any importance in the State. It connects tide-water at Portland with the southern extremity of Sebago Pond, with which and its tributaries it opens a communication of 40 miles with the back country. The canal itself is of small dimensions, and yet, though it is made through a country abounding with the necessary materials, and not presenting any other than ordinary difficulties, it has cost the company the sum of $250,000, or about $12,500 per mile. The locks, 25 in number, are, with one exception, built of timber, and so badly has the work been executed, that there is scarcely one that does not stand in need of entire rebuilding. The stone lock at Portland is built for one-third of the distance up of small uncoursed masonry, upon which, for the remainder, immense masses of well cut granite are piled without the least judgment; and though well caulked with pieces of shingle! it can only be filled at half or at full tide. The canal is connected with the "Canal Bank," which is interested in it to the amount of $150,000; and though it had every disadvantage under which to labor, it last year (1833) yielded a nett income of $12,000, principally derived from the tolls on lumber.

MIDDLESEX CANAL, from Boston to Chelmsford, Mass.—This canal was constructed with a view of opening a communication with the Merrimac River, and of drawing the trade of that river to Boston. Its length is 30 miles, breadth at surface 30 feet, bottom 20, depth of water 3 feet, 136 feet fall, and 20 locks. Incorporated 1789; completed 1808, and cost $528 000.

BLACKSTONE CANAL, extends from Worcester, Mass. to Providence, Rhode-Island, 45 miles.

Most of the articles carried up this canal are articles for consumption and manufacture. Those carried down are mostly manufactured articles.

The descent from Worcester to Providence is 451 feet, overcome by 48 locks, 80 feet by 10; width of canal at surface is 34, bottom 18, and depth of water 4 feet; completed in 1828, and cost $600,000.

FARMINGTON CANAL, commences at New Haven, Ct. and when completed will connect with the Connecticut river, at Northampton, Mass. 65 miles. This canal is 38 feet wide and 4 deep.

The Farmington, like the Blackstone Canal, is not a profitable investment.

PAWTUCKET CANAL, in Lowell, for passing a fall of the same name, of 32 feet. It is 80 feet wide, 4 feet deep, and 2 1-2 miles in length.

SOUTH HADLEY CANAL, constructed to pass the falls in South Hadley, on the Connecticut River, is 2 miles in length, and has a lockage of 40 feet.

MONTAGUE CANAL, constructed to pass the falls of the same name in that town, is 3 miles long, 25 feet wide, and 3 feet deep—lockage, 75 feet.

ERIE CANAL, NEW-YORK.—Commenced July 4th, 1817. First navigated from Utica to Rome, fifteen miles, October 23, 1819. Tolls first received July 1, 1820. 280 miles of canal completed, and first boat entered the Hudson at Albany, from the north and west, through the canal, October 8, 1823. Completed October, 1825. Length from Lake Erie to the Hudson river, 363 miles, viz.: Western section—Buffalo to Montezuma, on Seneca river, 157 miles, 21 locks, fall 186 feet; Middle do.—Montezuma to Utica, 96 miles, 11 locks, rise and fall 95 feet; Eastern do.—Utica to Albany, 110 miles, 52 locks, fall 417 feet. Total, 363 miles, 84 locks, rise and fall 698 feet.

Lake Erie is 565 feet above the Hudson river at Albany. The canal is 40 feet wide on the surface and 4 feet deep.

The success attending this canal may be taken as a conclusive argument in favor of constructing a ship canal from the Hudson to Lake Ontario around the Falls of Niagara, and from Chicago to the navigable waters of the Illinois River. The revenue of the canals in 1833 was $1,874,-614 41, and the expenditures to $739,453 08, including interest on canal debt and cost of repairs, &c., and leaving a balance of $1,135,161 33, to be applied towards liquidating the debt incurred for their construction. A ship or steamboat canal would cause, in ten years, an amount of business in this city very near, if not quite, double what will otherwise be done here. Who can estimate the amount of produce which would float through the lakes with such an outlet? It can hardly be estimated. Those who desire to see New-York sustain its rank amongst the cities of the Union, must aid in the consummation of this grand object.

CHAMPLAIN CANAL.—Begun October, 1817; navigable November, 1819. This canal commences at the junction with the Erie Canal, nine miles north of Albany, and terminates at Whitehall, in the county of Washington, connecting the waters of the Erie canal and the Hudson river with Lake Champlain. It has a lateral cut connecting it with the Hudson river by three locks at Waterford, eleven miles north of Albany, as the Erie canal has connecting it with the same river at West Troy, by two locks.

Length from Lake Champlain, at Whitehall, to junction with Erie canal, nine miles above Albany, sixty-three miles. Number of locks, as follows: 7 locks rise from the lake to the summit level, 54 feet; 14 do. fall from the summit level to the Hudson, 134. Total, 21 locks, rise and fall 188 feet.

OSWEGO CANAL.—Commenced, 1826; completed 1828. Length from Salina to Oswego, 38 miles; connecting Lake Ontario with the Erie canal. One half the distance is canal, and one half slack water, or river navigation, with a towing path on the bank. Fourteen locks, (13 of stone, and 1 of wood and stone.) Descent from Salina to Lake Ontario, 123 feet.

CAYUGA AND SENECA CANAL—commences at the Erie canal at Montezuma, Cayuga county, and terminates at Geneva, Ontario county, connecting the waters of the Erie canal with those of Seneca lake. This canal has also a lateral branch to East Cayuga village, on the Cayuga lake, thus connecting with the waters of that lake. It opens a lake navigation of more than 100 miles. Commenced 1827; completed 1829. Length twenty miles forty-four chains, from Geneva, on the Seneca lake, to Montezuma, on the Erie canal. One half canal and one half slack water navigation. 2710 feet of tow-path bridges. Eleven wood locks. Descent, 73 1-2 feet from Seneca lake to the Erie canal at Montezuma.

CHEMUNG CANAL—extends from the head waters of the Seneca lake to the Chemung (or Tioga) river; a branch of the Susquehannah, at the village of Elmira, Tioga county. Length 22 1-2 miles, with a navigable feeder from Painted Post, Steuben county, on the Chemung river, to the summit level, 13 1-2 miles, making thirty-six miles of canal navigation. This canal thus forms part of a chain of communication from the Erie canal to the Susquehannah river. It has fifty-two wood locks, comprising 516 feet of lockage, and one guard lock, three aqueducts, five culverts, and seventy-six bridges. Distance from Elmira to Albany, via this canal, Seneca lake, Cayuga and Seneca and Erie canals, 326 miles. Commenced 1830; completed 1833.

CROOKED LAKE CANAL—extends from Penn Yan to Dresden, both in Yates county, connecting the waters of the Crooked and Seneca lakes, through a beautiful and fertile country. It is eight miles in length, and has 260 feet of lockage, which is overcome by twenty-seven wood locks. The other structures are one guard lock, twelve bridges, three culverts, and one waste weir. Commenced 1830; completed 1833.

CHENANGO CANAL.—An act of the Legislature was passed, February, 1833, authorizing the construction of the Chenango canal, to extend from the Erie canal, in Oneida county, to the Susquehannah river at Binghamton, Broome county. Length about ninety-five miles. Route as follows: commencing at Whitesborough, or Utica, passing through the valleys of the Oriskany and Sauquoit creeks, and Chenango river, and by the towns and villages of New Hartford, Clinton, Madison, Hamilton, Sherburne, Norwich, Oxford, Greene, and Chenango Forkes, and terminating at Binghamton, where it unites with the Susquehannah river. Elevation from the Erie canal to the summit level, 706 feet; descent from thence to the Susquehannah river, 303 feet; total lockage, 1000 ft.

The estimated cost of this canal by Mr. Hutchinson, Civil Engineer, in 1828, was $944,775 36; but the Canal Commissioners, in their report of January, 1834, estimate the cost at $1,737,703 22.

During the season of 1833, surveys of different routes were made from Sherburne, a few miles south of the summit level, north to the Erie canal, and a preference given to the route terminating at Whitesborough. (The Legislature, at their session in 1834, decided to change it to Utica.) On this part of the canal there will be eighty-seven locks and four aqueducts; and it is proposed to construct the locks with wooden chambers, supported by a dry wall of stone masonry on the sides, excepting about eight feet below the upper gates. Some of the locks are to be of stone. The plan adopted for making this canal, and its different structures, will increase its aggregate cost beyond the sum for which a canal less substantial might have been constructed; but it is the opinion of the Canal Commissioners that it will prove the cheapest and most useful, requiring less expense for repairs. To supply the summit level with water, artificial reservoirs are to be constructed, and fed from ponds aud brooks.

Contracts for the thirty-eight miles between the Erie canal and the village of Sherburne, (excepting the reservoirs and feeders,) have been made, and the 15th of October, 1836, is the time stipulated for the completion of the work. Surveys have been made from Sherburne to Greene, Chenango county, and the present season the surveys from Greene to Binghamton will be completed. These sections will be placed under contract as soon as convenient after the completion of the surveys and estimates.

One million of dollars has been appropriated to the construction of this canal, and an additional million is recommended by the Commissioners in anticipation of contracts.

GENESEE AND ALLEGHENY CANAL.—Public attention has been frequently called to the subject of a canal proposed to be made from Rochester on the Erie canal, to Olean (or Hamilton) on the Allegheny river; and a bill was passed by the Legislature in 1834, directing a particular survey of the route, and estimate of the cost of construction. The route was superficially surveyed in 1825 by an engineer of the State, and in 1826 a report made to the Legislature by the Canal Commissioners. The canal is to commence at Rochester, following the valley of the Genesee river, through Monroe, Livingston, and Allegheny counties, until it reaches the Upper Genesee Falls, at Nunda, in the latter county, from whence it rises to the summit level 981 feet above the Erie canal. The length of the summit will be eight miles, and the whole fall, from thence to Olean, Cattaraugus county, on the Allegheny river, is seventy-eight feet. Whole lockage, ascending and descending, 1,059 feet. The length of canal from Rochester to Olean will vary little from 100 miles. The lockage is equal to 132 eight feet locks on the whole line; being about the same proportion of lockage as the Chenango canal. A passage from the Ohio valley to the Genesee valley is here 1488 feet above tide level, and is less elevated than any passage that has been examined either to the Potomac or the Susquehannah valleys. With regard to a supply of water for the summit level, it is remarked by the engineer that the whole of the Ischua Creek can be received into a summit pond; besides, the drainage of 190 miles of surface can be turned into it, so that the reservoir would be abundantly supplied with water. Mr. Roberts, engineer, gives the following account of the capacity of the streams in October, 1825.

Ischua Creek, cubic feet per minute .	750
Lime Lake, Beaver Lake, and Peacock Lake,	400
Oil Creek, ...	450
Together, per minute,	1600

In the report referred to, the estimated cost of the proposed canal is 875,588 dollars.

The distance of Rochester from Albany, by the Erie canal, is 270 miles; from thence to Olean, by the proposed canal, say 90 miles; from Olean to Pittsburg, by the Allegheny river, (which has been navigated by steamboats,) 260 miles.

The surveys have been commenced at the summit level, and will be continued in both directions. The work will probably be commenced next spring.

BLACK RIVER CANAL.—The Canal Commissioners report, March, 1831, that the cost of the proposed canal from Rome to the High Falls of the Black river, a distance of thirty-six miles, and including a navigable feeder of nine miles, at Boonville, with the improvement of forty miles of the river navigation from the High Falls to Carthage, is estimated at 602,544 dollars.

The whole rise and fall from Rome to the Black river, is . 1,078 feet.
Length of canal and river navigation, 76 miles.

The supply of water is to be obtained from the Black river, which, at Smith's mills, is estimated to afford 20,000 cubic feet per minute, in ordinary dry seasons.

Summary of Canals completed.

	Miles long.	Cost.	Tolls, 1833.
Erie Canal.....	363	9,027,456 05	1,290,136 20
Champlain do.	63	1,179,871 75	132,559 02
Oswego do.	38	565,437 35	22,950 47
Cayuga and Seneca do..	20	236,804 74	17,174 69
Chemung do. and feeder	36	342,133 95	694 00
Crooked Lake Canal...	8	136,331 95	200 84
	528	$11,488,035 99	$1,463,715 22

Navigable feeders on Erie, Champlain, and Cayuga and Seneca Canals, 11 miles,—making a total of 539 miles of canal navigation, completed and owned by the State. Average cost per mile, $21,314.

Statement of Tolls collected on the Erie Canal at Rochester, and other places west of the Genesee River, in 1832 *and* 1833.

	1832.	1833.
Rochester.....	154,541 08	168,452 37
Brockport	13,025 81	18,554 55
Albion.....	10,219 43	15,178 84
Lockport.....	28,434 22	50,562 39
Buffalo	58,232 09	73,812 79
	$264,452 63	$326,560 94

[N. Y. Annual Reg. for 1834.]

ONTARIO AND ERIE SHIP CANAL.—It is not a new idea that a ship canal should be constructed around the FALLS of *Niagara*. The importance of such a measure has long been maintained by men of discernment and judgment. Sooner or later it will be accomplished.

HUDSON AND ONTARIO SHIP CANAL.—The Erie canal in a few years will not, indeed it is not now, in ordinary seasons, be competent for the western trade; and if not now equal to the demands, what will it be in a few years hence, when the millions of acres, the most fertile in the world, now unoccupied, shall be brought into cultivation?

A SHIP Canal from the Hudson to Lake Ontario may be constructed for ten millions, probably *eight* millions of dollars; another around the Falls of Niagara for five millions, which would give an inland ship and steamboat navigation of fifteen to eighteen hundred miles; and a navigation, too, superior to any other inland navigation in the world. Then, with five millions more, a canal to correspond may be made from Lake Michigan to the navigable waters of the Illinois, which would give an uninterrupted inlandship communication of 3,500 miles. *Can* it be done? Yes—without difficulty. New-York *could* do it. *Will* it be done? *Yes;* but the *when* is, I apprehend, another affair. It can be done with as great ease as the British government can make a ship canal around the rapids of the St. Lawrence, for which it has recently appropriated $3,000,000, with a view of anticipating us, and of intercepting our western trade.

HUDSON AND DELAWARE CANAL, extends from the Hudson to Lackawaxen coal district; 140 miles.

MORRIS CANAL, N. J., connects the Delaware river at Easton, Pa., with the Passaic at Newark, and is to be continued to the Hudson at Jersey city. It is intended to facilitate the transportation of Lehigh coal to New-York; length 97 miles. On this canal, the elevation, which is over 1600 feet, is overcome by *inclined planes*, instead of locks, the only instance

now recollected of their application in this country. Width, 32 feet; 4 feet deep; lockage, 206·9 by 75, wood and stone.

DELAWARE AND RARITAN CANAL, connects the Delaware river at Bordentown with the Raritan at New Brunswick, passing Trenton, Princeton, and Kingston, on its route. This canal is supplied with water by a feeder, also navigable, from the Delaware at or above Lambertsville. Length of the canal — miles, breadth 75 feet, and depth of water 7 feet.

PENNSYLVANIA.—Internal improvements in this state are progressing with astonishing rapidity. It appears from the report of the Canal Commissioners, read in Senate December 6, 1832, that, of the works constructed by the State, there are completed in the canals now navigable, 479¼ miles; in hand and likely to be completed during the present year, [1833,] 103¾ miles; independently of these, there are others constructed at the expense of corporations, and now in actual use, 280¼ miles.

Canals constructed by the State.—1. Canal from Columbia, on the Susquehannah, to the mouth of the Juniata, and up the Juniata to Hollidaysburg at the eastern base of the Alleghany mountain—distance 171 miles 246 perches.

2. Canal from Johnstown on the Conemaugh, at the western base of the Alleghany, down the Conemaugh, Kiskeminetas and Alleghany, to Pittsburg—distance 105 miles. [The above lines, connected by the "Portage Railroad," over the mountain, form the great east and west communication. It has a double connection with Philadelphia, one from Columbia, by way of the Pennsylvania Railroad, and the other from Middletown, nine miles below Harrisburgh, and eighteen miles above Columbia, by the Union Canal.]

3. Canal from the mouth of the Juniata up the Susquehannah to the forks at Northumberland, then up the north branch to a point 2 miles below Wilkesbarre. Distance 96 miles 295 perches. [It is contemplated to extend this at some future day to the north line of the state, when a communication by canal and railroad may take place with the Erie Canal.]

4 Canal from Northumberland at the forks of the Susquehannah, up the west branch to the Muncy Dam—distance 26 miles 160 perches. [For extension see below.]

5. The French Creek Feeder, intended to supply with water the future communication between the Ohio and Lake Erie—length 19 miles.

6. A canal from Bristol to Easton on the Delaware—length 59 miles 240 perches. [This is the channel by which the coal trade of the Lehigh reaches Philadelphia.]

Canals constructed at the expense of Corporations, and now in actual use—7. The Union Canal, from the Schuylkill opposite Reading, to the Susquehannah at Middletown—length 82 miles 88 perches. Branch Canal and feeder, belonging to the Union Canal Company, 22 miles in length, with a railroad of four miles to the Pine Grove coal mines.

8. The Schuylkill Navigation, from Port Carbon on the Schuylkill to Philadelphia—length 108 miles.

9. The Lehigh Canal, from Easton on the Delaware up the Lehigh to Mauch Chunk—distance 46 miles.

10. A part of the Hudson and Delaware Canal, from Honesdale on the Lackawaxen to the mouth of that stream—supposed 20 miles.

11. Conestoga Navigation, an improvement of Conestoga creek by locks and dams, from its mouth up to the city of Lancaster—distance about 14 miles.

12 The Codorus navigation, an improvement of Codorus creek from its mouth up to the borough of York—length about 10 miles.

Total of canal navigation now in use, 759¾ miles.

The canals authorized and now in progress at the expense of the State, and likely to be navigable by the end of this year, [1833,] are

From Muncy Dam on the West Branch up that river to the mouth of Bald Eagle creek. Distance 40 miles and 18 perches [This is an extension of No. 4, and will complete the improvement contemplated in that quarter.]

From two miles below Wilkesbarre up the north branch of the Susquehannah to the mouth of the Lackawana—distance 12 miles 316 perches. [This is an extension of No. 3, and will leave about 90 miles towards the north line of the State untouched.]

From the confluence of the Beaver with the Ohio, (20 miles below Pittsburg,) up the former river to Newcastle—distance 24 miles 240 perches. [This is the commencement of a communication between the Ohio and Lake Erie, which will pursue a northerly direction up the valley of the Shenango to the summit at Conneaut Lake, thence to Lake Erie, at the town of Erie. At the Conneaut summit it will be supplied with water from French creek, by a feeder described above as No. 5. From Newcastle to Erie, by the route selected, will be about 78 miles.]

A canal and slackwater along French creek, from the commencement of the feeder to the junction of that creek with the Alleghany—distance, 25 miles 224 perches. [This work does not form a part of any great communication.]

By this statement it appears that after the present year only 90 miles on the north branch of the Susquehannah river, and 78 miles between the Ohio and Lake Erie, will remain to complete the whole system of improvement adopted by the State of Pennsylvania, and upon which operations commenced in the summer of 1826, less than seven years ago. That system will embrace when completed:

1. A great line of communication from Philadelphia, passing by Lancaster, Columbia, Middletown, Harrisburgh, Lewistown, Huntingdon, Hollidaysburg, Johnstown, Blairsville, Pittsburg, Beaver, Newcastle, and Meadville, to the Borough of Erie, on Lake Erie. The whole distance 481 miles, of which 118 miles are by railroad, 20 miles by the Ohio river, and 343 miles by canal. Distance from Philadelphia to Pittsburg 358 miles. [This passes through the great iron region of the Juniata, the salt and bituminous coal of the Conemaugh, Kiskeminetas, and Alleghany, and a country abounding in agricultural product.]

2. A great line from Philadelphia to the junction of the Tioga with the North Branch of Susquehannah, on the boundary of New-York, where a communication is now forming with the Erie Canal, by way of Chenango Point. This line diverges from the former at the mouth of the Juniata, and passes Liverpool, Selin's Grove, Northumberland, Danville, Berwick, Wilkesbarre, Pittston, Towanda, and Athens. It passes through the Wyoming coal region, and opens a rich agricultural country to market. Whole distance 324 miles, of which 81 miles are by railroad, and 234 by canal—common to the great western route 81 miles of railroad and 43 of canal.

3. The West Branch Canal from the mouth of Bald Eagle to the Forks at Northumberland, where it unites with the line last mentioned. It opens the richest land in the State, the valuable iron of Bald Eagle valley, and the inexhaustible beds of bituminous coal on the West Branch and its tributaries. These articles will have their choice of markets, between Philadelphia and the interior of New-York, where both are needed.

4. The Improvement of French creek and the Delaware Canal, which at present are rather detached works than parts of any great system of communication.

"BEAVER DIVISION" OF THE PENNSYLVANIA CANAL.—This section of the Canal commences at the town of Beaver, on the Ohio River, at the junction of the Big Beaver River, 30 miles below Pittsburg, and ascends the valley of the latter river, and that of its tributary the Shenango Creek, till its termination in Mercer county, a total distance of 30 miles and 240 perches. Of this distance, 8 miles and 100 perches are composed of canal, and the remaining 22 miles and 140 perches are of slackwater, composed by the pools of 7 dams, backing up the water variously from 2 to more than 7 miles. There are 18 lift and guard locks on the line, which for beauty and strength of workmanship are not surpassed by any in this country. The construction of these latter, together with that of the dams, has been very materially delayed, first by the want of the necessary appropriations, and afterwards by the unusually high and rapid freshets in the Shenango and Beaver Rivers. Still, however, under all these disadvantages, the canal will be finished by the end of 1834, and owing to the scientific and economical arrangement lately adopted by the state of Pennsylvania, in contradistinction to her previous course, this canal will be finished in the best manner, and handed over to the superintendent for the comparatively small sum of $481,282 98 cents, or about $16,650 per mile. Its construction was warranted by the prospect, when completed, of its yielding a handsome annual revenue.

CHESAPEAKE AND DELAWARE CANAL, from the Delaware river to Elk river, which discharges into Chesapeake Bay, 14 miles, long breadth 60 feet. It is calculated for vessels of draught not exceeding 10 feet.

CHESAPEAKE AND OHIO CANAL.—[See page 370.]

MIAMI CANAL.—This canal extends from Dayton to Cincinnati, 66 miles, where it connects with the Ohio by locks which overcome a difference of level of 112 feet.

OHIO AND ERIE CANAL.—This canal commences at Cleveland, on Lake Erie, and passes through the heart of the State to the Ohio river at Portsmouth. The main line of this canal is 310 miles in length, with 24 miles of navigable feeders. The work was completed in 1832, and with the Miami Canal, of 66 miles, making the entire navigable canals in the State, 400 miles, at a cost of about $5,500,000. And it has beyond all question increased the value of the State more than *three times* that amount, as do all judiciously located and well constructed works of the kind.

WABASH AND ERIE CANAL.—This work is intended to connect Lake Erie with the Wabash, and of course with the Ohio and Mississippi. An easier communication can, probably, be effected between Lake Erie and the Ohio on this line than on any other, and although we have very little information relative to its cost and progress, yet from the general topography of the country, it may well be assumed that a more favorable route for such a work is seldom found. It is progressing rapidly to a state of completion, as we understand. Although no intimation has ever been given us that the route could be made of sufficient dimensions for steamboats, yet it appears to us susceptible of, and highly favorable for, being so enlarged as to admit such steamboats to pass as navigate the rivers. Should this be done, and the communication be made direct from Lake *Erie*, instead of the more circuitous route through Lake Michigan, this, instead of the Chicago and Illinois route, will be the most favorable, and as Indiana is in the field, and her canal now under-way, if she would enlarge it, so as to permit the use of the Lake and Mississippi craft, she will secure an immediate advance in her general prosperity of at least *half a century*. Thirty miles of this canal were under contract, in 1833, to be completed in 1834, and the work will probably be completed in 1835 or '6, for boats.

LOUISVILLE AND OHIO CANAL.—This canal is constructed around the falls of the Ohio River at Louisville, and is of dimensions sufficient to pass the largest steamboats; and greatly facilitates the immense business on that river.

CHICAGO AND ILLINOIS CANAL OR RAILROAD.—This straight, or portage, may be termed the *Panama* of the United States. It will, ere long, be considered in that light by business men, and the result will inevitably be a *steamboat canal* from the Falls of the Illinois to Chicago, on Lake Michigan, which, together with a canal of similar construction around the Falls of *Niagara*, and from *Oswego* to the *Hudson river*, will give to the enterprise of the country an impetus which will astonish even the most *sanguine* of the present day. The distance from Chicago to the Falls is about 90 miles, through a country of the most favorable character for such an improvement. The elevation from the Lake is very trifling, only 25 feet, and the descent from thence to the foot of the Rapids, 175 feet in the distance of 80 miles, or a fraction over 2 feet per mile. Surveys have been made both for a canal and a railroad. A railroad would be preferable, unless the canal was of sufficient size for steamboats or sloops, which could also navigate the lakes. At all events, whether a canal or railroad shall be built, if soon effected, it will be amongst the most important works in the country. It would bring direct to New-York much that now goes to New-Orleans.

Mr. Bucklin, the engineer, who surveyed the route, estimates that a canal, drawing the water from the Lake for the whole distance, may be made for $4,043,036; if supplied with water from other sources, and lock down each way from the summit, it may be made for $1,601,695. A railroad for $1,052,488, and a M'Adam road for $1,041,624. A ship canal could probably be made, locking both ways, for $4,000,000; and upon a level with the Lake for less than six millions.

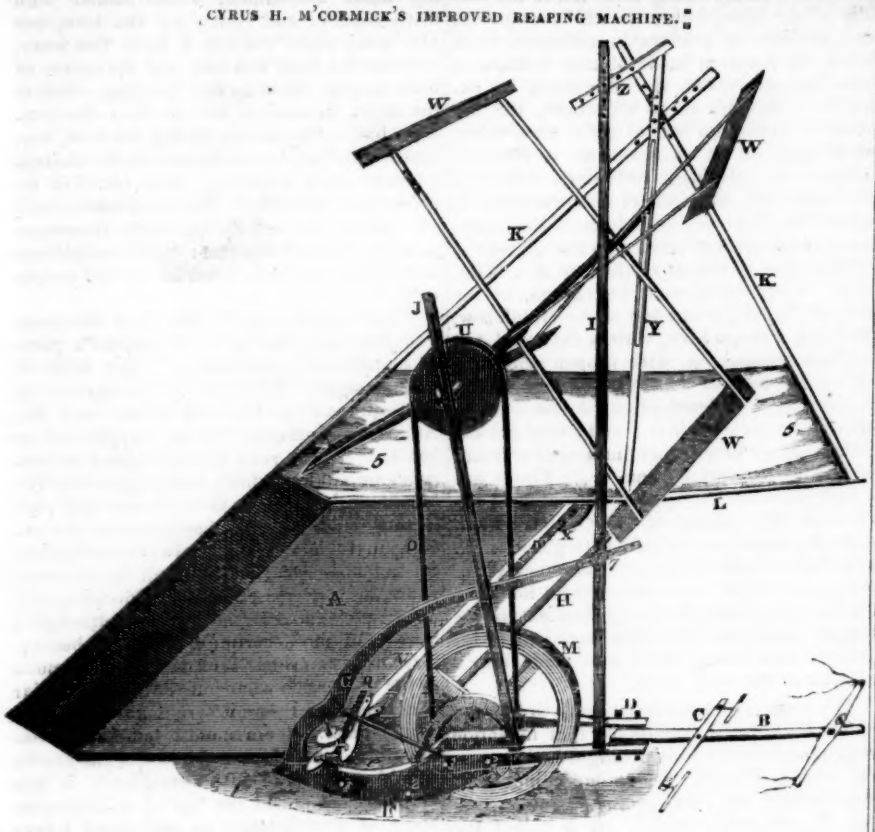
WISCONSIN PORTAGE CANAL.—A charter has been granted for a canal to connect the waters of the *Fox* and *Wisconsin* rivers of the north-western territory, by which there will be a water communication from the northern part of Lake Michigan, or Green Bay, to the Mississippi, at Prairie Du Chien, through these rivers.

LONDON, U. C., AND ONTARIO RAILROAD.—This road, if made, will become a great thoroughfare for those who emigrate to Michigan, even from the north-east, as it will be much the shortest route to the "far west," especially when the Boston and Ogdensburgh railroad shall be completed.

ONTARIO AND RICE LAKE CANAL, U. C.—The British Government have it also in contemplation to construct a canal from Lake Ontario to Rice Lake, and probably thence to Shallow and Simcoe Lakes, to connect with George's Bay, Lakes Huron and Superior, without passing Detroit. This work, to Rice Lake, a distance of 14 miles from Port Hope, is estimated to cost £101,535 15s. 6d. The elevation to be overcome is 361 feet. From Rice Lake to Simcoe and Georges, or Iroquois Bay, the communication is not difficult.

RIDEAU CANAL, U. C.—This canal connects the St. Lawrence, near Kingston, with the Ottawa River, at Bytown. The mouth of the canal above the level of tide-water is 110 feet, and 283 feet below the Rideau Lake, which is the summit level, and 129 feet below Lake Ontario, at Kingston. Its distance from Montreal is 120 miles, and from Kingston by water, 160, by land 130 miles. The Rideau Lake is 85 miles from the Ottawa. The outlet or river is not, for the first six miles above the Ottawa, used as the bed of the canal. The first rise from the Ottawa is 80 feet, overcome by eight locks. There is a basin sufficiently large for several boats between the fourth and fifth lock, and another at the end of the eighth, over which is a beautiful arch of cut stone, to afford an easy communication between Upper and Lower Bytown. These locks are 33 feet in breadth, and in length 134, or sufficiently large to admit the passage of steamboats. Their cost is estimated at £45,700. In this vicinity may be seen the "Union Bridge," one of the most daring undertakings ever conceived. It connects Upper and Lower Canada, and is thrown directly over the Falls of the Chaudiere, by means of the numerous rocky islands. It has *six* distinct arches; one of which is 210 feet, over the Grand Chaudiere, and another of 160. From Bytown, where the canal enters the Ottawa river, to the Rideau Lake, are fourteen rapids, which are overcome by twenty locks of various lifts, amounting to 283 feet. The summit level is 45 miles in length, when it communicates with Mud Lake by a cutting, for a mile and a half, of ten feet. From Mud Lake it passes into "Indian," and then, by a cutting, into "Cataraqui" river, which it follows to within fifty-five miles of Kingston. It follows the river and small lakes, and passes until it enters the "Kingston Bay," on Lake Ontario, 5 miles from Kingston. There are four locks, of nine feet each, at its termination. Rideau Lake is 145 feet above the Lake, and 283 above the *Ottawa* river, making the rise and fall 437 feet in a distance of 160 miles. This canal is the result of a wise policy of preparing in peace for war, and also of making such improvements, on *national* account, as tend alike to promote a country's prosperity in peace, and in war contribute to its safety and defence. Such is the policy of our natural enemies; and shall we, as a nation, do nothing upon a scale equally *national* to counterbalance it in case of another war? The true policy of this government is to construct a ship canal from the Hudson to Ontario—from Ontario to Erie, around the Falls of Niagara, and then from Chicago, on Lake Michigan, to the navigable waters of Illinois river, which will enable us to counteract any advantages to be derived from any works of the British government in Canada. We can then approach the Lakes from New-York or New-Orleans. Sooner or later it will be done.

CYRUS H. M'CORMICK'S IMPROVED REAPING MACHINE.



To the Editor of the Mechanics' Magazine:

DEAR SIR,—I send you a drawing and description of my Reaping Machine, agreeably to your request.

References—A, the platform; B, tongue; C, cross-bar; D, hinder end of the tongue; *e e*, projections in front; F, broad piece on each side; G, circular brace; H, diagonal brace; I, upright post; J, upright reel post; K, braces to upright; L, projection to regulate the width of swarth; M, main wheel roughened; N, band and cog wheel of 30 teeth; O, band; *p*, small bevel wheel of 9 teeth; Q, do. of 27 teeth; *r*, do. of 9 teeth; *s*, double crank; T, cutter; V, vibrating bar of wood, with bent teeth; U, reel pulley; W, reel; X, wheel of 15 inches diameter; Y, reel post.

The platform A is of plank, made fast to a frame of wood, for receiving the grain when cut, and holding it until enough has been collected for a sheaf, or more. The projections in front, *e e*, are two pieces of the platform frame, extending about 1½ feet in front, and one or more feet apart. On each outside of these pieces is to be secured a broad piece of wood, as at F, by screw bolts, as at 1 1, passing through them and the projection of the frame. From the end of the outer broad piece, nearest the platform, rises a circular brace, G, projecting forward, and secured to the reel-post, I, by a moveable screw bolt. About nine inches in front of the screw bolts, at 1 1, are two other *moveable* screw bolts, as at 2, passing through both broad pieces and the ends of both projections, allowing for a rise or fall in adjusting the height of cutting; and at about the same distance, further on, is to play an axis of a wheel to be hung between said pieces. Near each end of this axis is secured an arm with two screw bolts, as at 3 3, one of which is moveable, as will be seen; projecting before the wheel, where the tongue is made fast between them by means of two screw bolts passing through all at D. H is a diagonal brace. On the opposite side of the machine is another reel-post, Y, connected near the top with a piece, K, on each side, with a moveable screw bolt, and extending, one to the end of a piece, L, which is attached to the outside of the platform, and divides the grain to be cut, from that to be left standing, the other to the hind end of the platform. T is an upright post, secured to the braces of G and H, at 7, by a moveable bolt, bracing the reel-post Y by means of a piece, Z, passing diagonally over the reel. 5 5 is a strip of cloth about as high as the grain, for the purpose of keeping entirely separate the grain to be cut from that to be left. On the axis, hung between the hind pieces, is a wheel, M, of about two feet diameter, having the circumference curved with teeth to hold to the ground by. N is a cog wheel on the same axis, which serves also for a band wheel, on which and the pulley U the band O works. The cog wheel *p* working into the cog wheel N, has another cog wheel, Q, on its axle, which works into another small pinion, as at *r*, attached to the double crank *s*. These cranks are in a right line, projecting on opposite sides of the axis and in a line with the front edge of the platform. The lower of these works the cutter T, along the front edge of the platform, and the upper one the vibrating bar V, counter to each other. The cutter is a long blade of steel, with an edge like that of a reap-hook, and is supported on the under side by stationary pieces of wood at suitable distances apart. This blade is attached to the frame piece, below the edge of the platform, by means of moveable tongues or slips of metal; the bolt securing it to said frame-piece acting as a pivot, and that through the blade likewise, so that the motion is described in part of a circle. The vibrating bar is of wood, of the same length, and secured in the same manner, above the cutter, with iron teeth made fast in it, at about 2 inches apart, extending before the edge of the cutter, and bent round under it. This vibrating bar has been and may be made stationary, with bent teeth supporting the stalks on each side of the cutter, thereby dispensing with the upper crank; but the other is much preferable, as it reduces the friction and liability to wear materially, by dividing the motion necessary for one between the two, and counterbalancing each other.

In the upper end of each reel-post is a groove, or long mortice, to receive the end of the axis of the reel, which rests on an adjusting pin, subject to be moved higher or lower, to suit grain of different heights—rye, wheat, or oats, &c. The reel W is composed of two or more cross arms at each end of the axle, projecting about 3 feet each way, and connected at their ends by a thin board of about nine inches in width, which, by the arrangement of the arms, runs in a somewhat spiral direction along the axis (though it might be parallel), the right end bearing up first on the grain. This reel, by the motion given by the strap O as the horses advance, bears the stalks upon the cutter, and when separated lands them on the platform A, which advancing till a sufficient quantity is collected, is discharged as often as may be required by a hand with a rake at the right end of the platform. On the left end of the platform is a wheel, H, of about 15 inches diameter, that may be raised or lowered as the cutting may require, corresponding with the opposite side. The point of the tongue is secured to its place by passing through a pin, 6, that is fastened to the hames of each horse by means of leather straps.

I have made some alterations on the drawing, which I think you will readily understand. Two horses were not used to the machine until the last harvest; the necessary changes of which were only described to the draughtsman, and were not all understood. I directed that it should not exceed 5¼ inches, though I think it does one way. The wheel H I think has a wrong direction.

Very respectfully, yours, &c.

C. H. M'CORMICK.

MODE OF PURIFYING PALM OIL.—*To purify Palm Oil, and to whiten it comparatively for making soap.* Take two parts of quick lime and three parts of the muriate of ammonia, the lime having been previously slacked with half its weight of water, and allowed to cool and reduced to a fine powder, and the muriate of ammonia having also been reduced to a fine powder, and then intimately blended with the powdered lime. The mixture is to be put into a still, or cast iron pan, having a close cover to it, and a tube leading from the head of the pan, or still, to near the bottom of the soap copper, which should contain equal quantities of water and palm oil. On fire being applied to the still, the ammoniacal gas will pass over into the soap copper; and as the water and oil combine, continue adding boiling water to the extent of treble the weight of palm oil in all. By this process the color of the palm oil will be almost instantaneously changed to a pale yellow. The boiling palm oil and water should, of course, be kept rapidly stirring while the gas is passing through. The ammonia, being an alkali, adds to the strength and detergency of the

soap, while the peculiar smell imparted by it is so weak as scarcely to be susceptible after a few days' exposure to the atmosphere. —[London Mech. Mag.]

Some More Notes on Mr. Nutt's Book on Bees.

[From the London Mechanics' Magazine.]

SIR,—In consequence of your inserting in your Magazine my remarks on Mr. Nutt's book, I am emboldened to continue them;* but in doing so I shall endeavor to be as concise as possible.

We are told, "on rising early one morning in July, 1827, and walking into an apiary, as my custom then was and still is, I found that some malicious wretch had been there before me, and overturned a fine colony of bees." Is it not possible that the fine colony of bees, by being placed, as we are informed they were, on a square box, toppled off (to use an expression of Mr. Nutt's) of their own accord, without the assistance of "the malicious wretch?" Sir Joseph Banks, if Dr. Walcot can be relied on, was once the occasion of a similar accident when engaged in some interesting entomological pursuits.

Mr. Nutt, with "invention ever new," immediately converts the malice of this "malicious wretch" into a great benefit, for it leads to the invention of a bee-hive at least equal in value to his "matchless one." It is called the inverted hive, though, to a plain bee master like myself, to turn a bee-hive topsy-turvy appears an absurdity. Indeed, Mr. Nutt, when enumerating his objections to the practice of driving bees, acknowledges it to be so. He says they are turned topsy-turvy, and describes it very truly as a "strange unnatural position," though when descanting on the merits of his own invention it becomes instanter the very best possible position. Mr. Nutt must, however, have overlooked one inconvenience arising from it—at least, so it appears to me. The cells in the comb, as built by the bees in the hive, have an inclination so great as to admit of being completely filled with honey, without requiring to be sealed with wax, which is never done, excepting the honey is intended for use in winter. By turning the hive topsy-turvy, as in this unique invention, if there be any honey in the cells at the time the operation is performed, (which is extremely probable, as it is recommended to be done between the months of March and October,) every drop will run out, and lodging at the bottom of the hive, will probably destroy the greatest part of the bees, and those not absolutely killed will be so daubed with it as never after to be able to fly—an objection, by the way, which Mr. Nutt avails himself of, and strenuously urges when condemning the storying practice. There is another very powerful objection to this topsy-turvy hive, which must be obvious to every one. When a hive is placed, as it usually is, on a stand, by carefully lifting it on one side, the stand can be easily cleaned (which Mr. Nutt very properly recommends to be frequently done); but how is such an operation to be performed when the hive is turned topsy-turvy? It is impossible. Every thing must fall to the bottom of the hive, where it will accumulate and become an intolerable nuisance, there being no mention made of any semi-lunar hole through which the filth might be extracted. Besides these objections, the expense of fitting up one of these topsy-turvy hives must be so enormous as to counterbalance any advantage to be derived from it. The only part, after all, of this invention, to which Mr. Nutt has any claim, is the topsy-turvy part—all that relates to the glasses is entirely the invention of the late Mr. Wildman. I purchased some years ago, at the shop of Mr. Wildman, just above Middlerow, Holborn, a straw hive, with a flat wood top to place glasses on, with proper apertures cut for the bees to work through into them, exactly as I understand to be the case in Mr. Nutt's inverted hive; and I now get excellent straw hives, made in a similar manner, at a less price than 4s. There are boxes made on the same construction, I believe, by Mr. Milton, of Marylebone street, who also furnishes the requisite glasses. It is farther worthy of observation, that Wildman gives in his book plates of all his hives —*these hives with glasses on them among the number*—and that Mr. Nutt mentions in his preface that some friend had made him a present of this very book.

We come at length to the most prominent of all Mr. Nutt's inventions, that invention which, according to his distinguished patron, the "learned lord," is "a more ingenious contrivance" than was ever "put into operation by any other man." It is called the "observatory hive," afterwards the "grand hive;" and as if neither of these titles was sufficiently distinctive, ultimately the "blessed hive."

> "By this bless'd hive our ravish'd eyes behold
> The singing masons build their roofs of gold."

"Singing masons!" I have long and anxiously studied the sublime mysteries of masonry, and obtained the very highest degrees conferred by our grand professors; but this is the first time I ever heard of its being a characteristic of a good mason to sing at his work. No: such things are never thought of by any of my brethren until they have ceased labor, and are partaking refreshment. I do not deny that some unworthy characters may be found in so numerous a body as my craft consists of. By tradition, we know that two pestilent fellows were engaged in the building of Solomon's Temple, and the atrocious act they committed is still deeply deplored by all good masons. I apprehend the idea that masons mis-spend their time in singing was communicated to Mr. Nutt by his noble patron the "learned lord," who, from his acquaintance with the ancient authors, has no doubt read the following story, which is to be found in Thomas Bozius de Signis Ecclesiæ: "How certaine theeves, having stolen the silver boxe wherein the wafer gods used to lye, and finding one of them there, being loth, belike, that hee should lye abroad all night, did not cast him away, but laid him under a hive: whom the bees acknowledging, advanced him to an high roome in the hive, and there in stead of his silver boxe, made him another of the whitest waxe: and when they had so done, in worship of him, at set houres they sung most sweetly beyond all measure about it: yea, the owner tooke them at it at midnight, with a light and all. Wherewith the bishop being made acquainted, came thither with many others; and lifting up the hive, hee saw there neere the top a most fine boxe, wherein the host was laid, and the quires of bees singing about it, and keeping watch in the night, as monkes doe in their cloisters. The bishop, therefore, taking the host, carried it with the greatest honor into the church; whither many resorting, were cured of innumerable diseases." The conclusion which the author necessarily inferreth thereupon is better than all the rest: "Ex his necesse dicamus in eucharistia verum Christi corpus esse."

This "blessed hive," Mr. Nutt observes, "*at first sight* may probably appear a piece of complicated machinery." But what at second sight? I will venture to answer for every person who has read or may read Mr. Nutt's description—"just as complicated as before!" I have read the description of every steam engine which has appeared in the Mechanics' Magazine ever since its first publication, and, with the assistance of the accompanying plates, could always understand the machine described as well as a person not being a professed or scientific mechanic could be expected to do; but although I have read the description of the "observatory hive" ten times over, I am still as much in the dark as to what constitutes its peculiar excellence, as I was before I possessed Mr. Nutt's book. I am almost tempted to believe Mr. Nutt did not intend that the reader should understand his description; it has certainly as much the air of a deliberate piece of mystification as any thing I ever met with. I must, however, return my thanks to Mr. Nutt for one piece of information he has given of *great importance*, which is, that in writing the description of this "grand," this "blessed" hive, he did not consume the midnigh toil, but used "a *tallow* candle of his *own* making, stuck in a *telescope* candlestick, with a *square* foot!"

The directions for stocking with bees this observatory hive are too diffuse to remark on; but I cannot avoid noticing the pertinacity with which Mr. Nutt maintains his assertion, that two hives of bees will quietly unite on being put together, and become as one family. The observatory hive, in summer, consists of two distinct families—one inhabiting the topsy-turvy part, and the other what is properly the observatory or part to peep into. A piece of mechanism resembling the telescope candlestick, used by Mr. Nutt when writing the description of it, keeps the two families completely separated during the summer; but on a slide being withdrawn in the autumn, the bees in the observatory part are said to quit their summer residence and join their topsy-turvy neighbors, who, strange to tell, quietly unite with them: the united bodies continuing henceforward, according to Mr. Nutt, to labor as one family. I have before observed, and again repeat, that they will do no such thing without fighting. Their combats, in such cases, are carried on with all the animosity of two hostile tribes of Indians—a fact well known to every person who is the least acquainted with the habits of bees.

The only farther notice I shall take of Mr. Nutt's "grand" or "blessed" hive, is to mention that the thermometer, which he had previously taught us to believe was an indispensable instrument in the humane management of the honey bee, is dispensed with

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* We think our correspondent's remarks are written in the spirit of truth, and therefore willingly insert them; which we do the more readily, that though ample time has been afforded to Mr. Nutt and his admirers to refute the former strictures of the same writer, they still remain unrefuted in every essential particular—the friendly efforts of Mr. Booth and K. notwithstanding.—[ED. L. M. M.]

in this as well as in the topsy-turvy hive. Are we to infer from this that it is a matter of no consideration whether the bees in either of *these* hives are treated humanely or not?

I am now come to the chapter on fumigation, which appeared in the Mechanics' Magazine,* by which I was enabled, previously to possessing Mr. Nutt's book, completely to demolish every pretension he could possibly have to call himself the discoverer of that process, although he arrogates to himself all the merit of it. I refer to my letter inserted in the Mechanics' Magazine of the 11th January last, in which I proved that he had copied the whole of his directions how to perform the operation, *verbatim*, from the work of Mr. Thorley, which no other person, to use the language of the learned lord, "save Mr. Nutt," would have done, without mentioning the source from whence he obtained the information. But this is not all.

I am now able to prove that fumigating bees was a common custom 150 years before even Mr. Thorley wrote his book. I possess an elaborate work, written by that profound scholar and learned physician, Dr. John Gerard, called his "Herbal," my edition of which was printed in 1597, and I shall extract from it what is said respecting the very fungus Mr. Nutt uses for his *newly* discovered process of fumigation. From this it will appear that Mr. Nutt and his apiarian pupils, both patrician and clerical, have been using a very dangerous article. The Doctor's words are, "It is called fungus orbicularis, or lupi crepitus; some do call it fungus lucernarum, in English fusse balls, pucke fusse, and bull fists, which in some places of England they use, being set on fire to kill or smolder their bees when they would drive the hives, and bereave the poor bees of their meat houses and lives, for which purpose it fitly serveth. In form they are very round, sticking and cleaving unto the ground, without any stalks, at first white, but afterwards of a duskish color, having no hole or breach in them whereby a man may see into them, but being trodden upon do breake forth a most thin and fine powder, like unto smoke, very noisome to the eies, causing a kind of blindnesse, which is called poore blinde or sand blinde; for it has been often seen that divers have been blinde ever after, when a small quantity hath been blown into their eies."

Mr. Nutt, at the commencement of his 14th chapter, admits that, in the previous one, he had been to sea without a pilot—the meaning of which nautical phrase, if I understand it, is that he had been writing on a subject of which he was entirely ignorant: an admission which he might have made with equal propriety at the commencement of every chapter in his book. The opinion which he entertains, that the old queen bee leaves her hive with the first swarm, I do not myself entertain, although Dr. Bevan does; but as the Doctor, in his work on bees, makes no mention of having made any experiment himself to ascertain the fact, I do not feel bound to pay much attention to the Doctor's dictum, although I entertain a high respect for him. Mr. Nutt has evidently borrowed the idea from Huber, whose work on bees was translated into English so long ago as 1808; and although he has positively asserted that he never obtained any knowledge of bees from books, many persons like myself will be incredulous, knowing he could avail himself of the discoveries of Huber twenty-four years before his own book was published. My incredulity is increased by the praise he lavishes on the discovery of Shirach, which he tells the learned lord he had proved satisfactorily to his own mind, although, from his ignorance of every thing respecting the true economy of bees, I believe him incapable of performing such an experiment. I was convinced he had read Huber when I first addressed you; and when I knew nothing of his book but through the medium of the Mechanics' Magazine, by his using the following expression, "How is the queen bee impregnated?"—which is copied from Huber. Mr. Nutt describes the queen's leaving the hive as follows: "She leaves the *royal cradle impregnated* with the royal larvæ, and withdraws from the hive, unwillingly,—no doubt." If there be such a degree of unwillingness on the part of the old lady to withdraw from the hive, why does she not wait a few days, when, if I understand Mr. Nutt's expression, the impregnation of the royal cradle would have arrived at that stage which, by accoucheurs, is called parturition, which would have obviated the necessity of the journey? The laborious experiments of Huber, to ascertain whether the old queen departed from the hive with the first swarm, were undertaken at the suggestion of the French naturalist, Bonnet, to whom all Huber's letters detailing the result of them are addressed. Bonnet, in a very long letter which he wrote Huber at the time, urged him in the strongest language never to mutilate the queen, but to mark her on the thorax conspicuously, with a varnish that would resist humidity, and produce no injurious effects. This advice Huber, however, pertinaciously rejected; for, in every experiment he gives an account of, he invariably deprived the queen of one of her antennæ. Now, Bonnet, in giving such advice to Huber, must have been well aware that by mutilation the habits of the insect would be altered; indeed it is so, if the creature is only deprived of a limb—how much more, then, when deprived of such an important organ as the antennæ, which he allows are either the organs of feeling or smelling. He admits, also, that depriving a queen of *both* antennæ was productive of most singular effects. From the moment of its being done, there was a very great alteration in her conduct; she was sometimes quite motionless, at others she traversed the combs with great rapidity, and if she wanted food from the working bees, she directed her trunk for the purpose of receiving it with an uncertain kind of feeling, sometimes towards the bees, and sometimes against the combs; and if her trunk did reach the mouths of the bees, it was by chance. She also appeared tormented with a desire to leave her habitation, and he found it impossible to keep her in the hive: neither would the bees follow her in this mutilated state—indeed, they appeared perfectly indifferent what became of her. If this be the consequence of amputating both the antennæ, why then persist in mutilating the insect at all, particularly when in direct opposition to the advice of the person for whose satisfaction the experiments were undertaken? If such effects were produced by depriving the insect of both antennæ, is it not natural to suppose that the amputation of even one must produce some great alteration likewise in the insect's conduct, such as being tormented with a desire to leave the hive? I am convinced it does create this desire, and that it is carried into execution the first moment she can induce a swarm to accompany her. My opinion is strengthened by what Huber says, that his bees always swarmed when he had no expectation of their doing so; for it always happened after his secretary and himself had been engaged in experiments with them, and had gone away. I never shall be of Huber's opinion, until I hear of a series of experiments conducted in the manner suggested by Bonnet, and attended with similar results to those recorded by him. He admits that, when in a perfect state, the bees will never allow, for any length of time, more than one queen to remain in a hive, in consequence of the natural animosity that exists between them; although when deprived of one antennæ each, they will permit two, and the queens cease to retain their usual enmity to each other.

It is absolutely astonishing with what facility Mr. Nutt, according to his own account, has been induced to adopt the idea of the old queen leaving her hive with the first swarm, for the following is an account of the whole of his researches on the subject: he has, he says, sometimes on the evening a hive has swarmed—sometimes on the second, at other times on the third, evening afterwards—fumigated the hive, dissected and examined the combs and queen cells minutely, and whenever he has found a queen it has always invariably been a young one; but in general, he has only found a royal cell, just ready as it were to give birth to a successor to that which had left the hive. In this easy and expeditious way does Mr. Nutt solve a problem, which occupied the indefatigable Huber and his equally indefatigable secretary many years. Even in this experiment, as it is called, trifling as it is, he is incorrect. He says, the queen withdraws from the hive, leaving the royal cradle only impregnated. I once had a swarm that settled on a post, and in hiving it the queen was killed; the bees in consequence returned to the hive. The same evening the usual noise, which is made before a second swarm, was made, and I distinctly heard it from different parts of the hive at the same time—a proof, that instead of the royal cradle only being impregnated, there were two queens actually then in existence; the hive swarmed early the next morning. Reaumur, who studied the habits of bees many years, and is called, from the great knowledge he acquired of the insect, the historian of bees, did not believe the old queen left the hive; and Huber admits he never in any other instance found him inaccurate. An ancient author, named Publius Virgilius Maro, has recorded his opinion against Mr. Nutt very decidedly in the following words, as rendered by Dryden:

> "The youthful prince, with proud alarm,
> Leads out the vent'rous colony to swarm."

The same author informs us that the evil of bees swarming, which Mr. Nutt now so feelingly deplores, existed in his time, and recommends, when such a distressing event occurs, to mix with tinkling brass "the cymbal's droning sound;" and as I am

* See page 129, vol. vi. of the N. Y. Farmer (1833.)

resolved such a laudable practice shall not fall into desuetude through any neglect of mine, and not possessing any cymbals, I use an instrument, probably unknown to my ancient author, yclept a warming-pan, which I find from experience answers equally well. Butler, whose work, the "Feminine Monarchie," was translated into Latin in 1671, believed a young queen led the first swarm. John Geddie, Wildman, Bonnor, Mr. John Hunter, and many other authors, were of the same opinion. I do not possess the works of Aristotle or the Elder Pliny, and therefore cannot avail myself of those great authorities. It very frequently happens, when a swarm issues from a hive it returns almost immediately. This is occasioned by the queen falling to the ground or being unable to fly. On being missed by the bees they return; and in general she can easily be found on the ground with a small cluster of bees surrounding her; and if examined, she will be found to be a young one, unable to fly. The circumstance is noticed by many authors—I know even of instances that have occurred this year. Mr. Nutt appears to be of opinion that the queen is an amalgamation of both sexes. He doubts whether there is any male bee, and says the fact is the queen is both virgin and mother; although, according to his own book, the queen carries on the business of procreation in what he calls the Pavilion! Afterwards he says there is no copulation. If I understand any thing of my own language, both words have the same meaning. When the learned lord asks him how generation was brought about, he finds himself at such a nonplus as to be incapable of an answer, but turns the discourse, and says he is confident neither drones nor working bees lay eggs. No person supposes the drone does; but Huber is of opinion that there are fertile working bees. Mr. Nutt says that even the indefatigable Huber never discovered the precise way in which the queen bee was impregnated, but imagined it took place in the air, and that he *modestly* acknowledged he never witnessed the act of copulation. Mr. Nutt should have omitted applying the term *modest* to such a man as Huber, for there may be persons who will draw a comparison between the modesty of Huber and himself, and I will not say he would benefit by the comparison. Huber not only supposed the act of coition took place in the air, but that the drone died immediately after it was effected. I believe his ideas are correct. It is well known what takes place in the air with the common house fly; the same thing takes place with the white butterfly and the common May-fly. The male of the latter dies shortly after coition, as Huber conjectures is the case with the drone; for the effect is the same as when a bee uses its sting, death being the consequence. Mr. Nutt makes strange assertions; he says the royal larvæ are *always* in existence. In another place he states, that if it were not for the great heat caused by the drones, that are never seen but from May until the end of August, the young larvæ of all the bees would undoubtedly perish. But how do the drones themselves come into existence? In the very next page he asserts, that the bees of a well populated hive will always bring to perfection the queen's eggs that have been deposited in the cells after the total destruction of the drones. Shortly afterwards a new light opens on Mr. Nutt, and he now doubts the accuracy of his opinion, so positively expressed in his conversation with the learned lord, that the queen bee was both virgin and mother. In short, he says, "I now see no objection to Huber's theory, although there is no direct proof of the copulation of the queen with the drone." All apiarians agree—indeed it is impossible to deny—that there are male and female in a hive of bees. Mr. Nutt very shrewdly observes, that although no person has ever observed the act of coition, it is, no doubt, performed in a way consistent with the law of nature! A very candid admission.

It was my intention to have made some remarks on Mr. Nutt's pretensions to entomological knowledge, but find, on a careful perusal of his book, that he is absolutely ignorant of every part of the science. I now close my remarks on his book, requesting your acceptance of my grateful acknowledgments for the insertion of them in your very useful Magazine.

I am, Sir, yours, &c. J. P. T.
June 24, 1834.

WOOLLEN CLOTH MADE FROM OLD RAGS.—It is probably very little known, that an extensive manufacture is carried on in this neighborhood by which old rags are made into new cloth: yet such is the fact, and to so great an extent that at least 5,000,000 lbs. weight of woollen rags are yearly imported from Germany, and other parts, for this purpose. The rags are subjected to a machine which tears them in pieces, and reduces them to nearly their primitive state of wool; and they are then, with a small admixture of new wool, again carded, slubbed, spun, and woven, and they make a cloth not very strong, but answering very well for paddings, shoddies, and other similar purposes. The manufacture is carried on chiefly in the neighborhood of Batley.—[Leeds Mercury.]

AGRICULTURAL PULVERIZER; B. F. Stickney, Vistula, Monroe County, Michigan Territory, March 1.—There is a striking resemblance between this machine and that patented by Mr. Jas. D. Woodside, on the 28th of July, 1832: the main difference being in making the part which is to pulverise the ground in the form of cultivator teeth, and allowing them to fall back by means of a hinge joint close to the roller, whilst in Mr. Woodside's machine thay are permanent teeth, or spikes. The roller around which the cutters, or hoes, are fixed, receives its motion by gearing from wheels which roll upon the ground, and there is a lever to raise or depress the roller as in the former machine. It is also proposed to place spikes or pins on the faces of the wheels which run upon the ground, should the friction not be sufficient to drive the roller with its cutters. There is no claim made.

We have alluded to Mr. Woodside's patent, but find that our notice of it was accidentally omitted in its proper place; but as this instrument is now coming into use, we design, at an early day, to place the specification of it, with a cut, before our readers.—[Journal of Franklin Institute.]

MILL FOR CRACKING OR GRINDING CORN OR OTHER GRAIN; Benjamin Hinkley, Fayette, Kennebeck county, Maine, March 10.—The corn to be broken is put into a hopper having a longitudinal slot in the bottom of it, against which revolves a steel roller, about two and a half inches in diameter, and twelve inches long; the face of this roller is cut like a rasp or grater. A flat plate of wrought iron stands along the cylinder, their distance apart being adjusted by screws; and between these the grain descends when the roller is turned. To give the proper motion there is a cog wheel, pinion, and fly wheel, fixed in the usual manner. The claim is to "the particular form of the solid steel cylinder shaft, and the indented, or rasping, surface made upon the grinding part of the same; and the flat surface of iron, and the manner of screwing and gauging the same to and from the cylinder."

The similarity between this machine and that of Webber Furbish, will be apparent to any one.—[Ib.]

WHEELS FOR CARRIAGES OF ALL KINDS; Henry Beebe, Haverstraw, Rockland county, New-York, March 12.—This wheel is to be made with a rim and spokes of wrought iron, and a hub of cast iron. The rim for a four feet six wheel, it is proposed to make of iron five-sixteenths thick, and one and three-eighths wide. After this is formed into a hoop, holes are to be bored in it to correspond with the number and size of the spokes; these latter are tapped and have nuts on their outer ends, the screw slides freely within the holes in the rim, which are smooth. When the hub is to be cast, it is moulded in such a way that the bore to receive the axle may have an enlarged opening in the centre, for the sake of lightness, and to contain oil, &c. The spokes, surrounded by the rim, are laid in the flask, so that the cast metal shall embrace their inner ends. When cast, the wheel is placed upon an axle and turned round, to try if the rim is true; to make it so, the nuts are tightened up against it, and when true, the projecting ends of the spokes are removed and heated tire put on. The claim is to "the whole of the machine, or wheel, above described, when taken together, and the mode and manner of constructing the same, particularly the principle of constructing the hub upon the iron or steel spokes. But no claim is made for the mode of making the hub, the spoke, the rim, or the tire, or any of the parts of this machine, or wheel, taken separately." The hubs of wheels have often been cast upon wrought iron spokes; it would seem, therefore that the *particular principle* claimed is not new. We doubt the goodness of the whole wheel, and particularly the durability of the connexion between the cast iron hub and wrought iron spokes.—[Ib.]

EXTRICATING HORSES FROM CARRIAGES: O. R. Broyles, Anderson Court House, Pendleton District, South Carolina, March 17.—In this apparatus the windlasses to which the leathers of the swingletrees are attached are made capable of revolving, so as to present their reversed sides to the horses, and so constructed as the swingletrees will, in that case, be detached, and the horses liberated. They are ordinarily held in their places by two levers, connected together by a rope at their extreme ends, but according to the present mode their connection is destroyed, and the horses freed by pulling a line which passes from them to the carriage. The plan appears to be relied on as altogether new, no claim being made to any part of it. The particular arrangement described may probably be original, but there are others bearing some analogy to it, equally simple, and operating equally well, which have been introduced, but have never gone into extended use. The fact is, that whilst we laugh at the sailor who objects to a cork jacket, or other life-preserver, because he is apprehensive that it may invite the catastrophe against which it is to guard, most of us neglect those precautions that are intended to protect us against *possible* danger only.—[Ib.]

CORN FOR HOGS.—Those who have not the conveniences for cracking or boiling their hard corn, can easily provide ways and means to give it a slight fermentation.

Essay on the Indian Summer, read at a meeting of the Maryland Academy of Sciences, by one of its Members, Baltimore, Dec. 16, 1833. [From Silliman's Journal.]

The following pages contain a few observations on that peculiar and periodical appearance of the atmosphere, usually termed Indian summer; in this essay, the writer has made a feeble attempt to explain some of the more prominent causes concerned in its production—and to offer views explanatory of the attending phenomena—such as the smoky and reddish aspect of the sky, the increased temperature, &c. &c.

Attention was directed to this investigation, in consequence of the verbal notice taken by one of the members of this Academy, of a paragraph contained in a late number of the American Journal of Science, and which requested of some one of the correspondents of that valuable work, an explanation of the causes of this occurrence. The subject at once presented itself to the mind, as one of much interest; and indeed excited astonishment, that hitherto no written or satisfactory explanation has been made of a phenomenon, which, from its regular appearance, obvious character, and marked duration, has become familiar to almost every inhabitant of this country. The total silence of books, and consequent want of reference, is a sufficient apology for many imperfections—the writer was left to draw conclusions wholly from his own reflections, on the more prominent and attending facts, and of which there is no other record than memory.

The term Indian summer has been applied to that obscure and hazy condition of the atmosphere which usually occurs towards the last of November, attended with a peculiar redness of the sky—an absence of rain—and we might add, an obviously increased temperature; which latter fact is in some degree significant of its name; probably the appellation of Indian is derived from the circumstance of this period of the year being selected by the aborigines of the country as their hunting season, to which it is highly conducive, not only on account of the plenty and perfection of the game, but also in consequence of the haziness or obscurity of the air, which favors a near and unsuspected approach to the object of pursuit. The New-England tradition is, that the term Indian summer is derived from the prevalence of the south-west wind at that time—and which the Indians supposed to be sent as a peculiar favor from their good deity Coutantowit, supposed to reside in that quarter.

Having stated that the Indian summer appears usually in the month of November, we do not, however, wish to be understood that a haziness or obscurity of the air occurs in that month only, and that its duration is confined, and peculiar to, a few days in the latter part of the autumnal season—on the contrary, common observation, (as well as minute reference to meteorological tables,) proves that it is by no means uncommon in the month of October, and is frequently mistaken then for the true Indian summer, by persons unacquainted with the proper period of its accession. This is a fact which we wish borne in mind,—as it enables us to account for one of the general laws on which the phenomenon is dependent, but which would not apply, were we erroneously to confine the prevalence of a hazy atmosphere to a few days at the commencement of winter. It is true that at this period there is usually a longer and more closely connected exhibition of character, and to which, (as before observed,) the term Indian summer is correctly applied—but were we to see no analogy in the general aspect of the fall season, we should be forced to search wholly among local causes, for the explanation of a fact, in which a regular and extended variation of temperature, (dependent on the sun's annual declination,) is obviously concerned as a leading or predisposing cause.

The regular yearly changes of temperature greatly affect the transparency of the atmosphere, and give it, at certain seasons, a peculiar appearance; for instance, during the spring, when the temperature of the air is evidently on the increase, its capacity for moisture increases faster than the additions which are made to its humidity by evaporation or moderately moist winds; whereas, during the autumn, the temperature is as rapidly on the decline, and the capacity of the air to contain moisture being on the decrease, a slight addition to its humidity produces hazy or foggy weather. This autumnal obscurity of the atmosphere would prevail more generally here, (as it does in England and the northern shores of Europe,) were it not for the frequency of our north-westerly winds, which from their dryness are always attended with a cloudless sky. Having ascertained that the annual variation of temperature is one of the great predisposing causes of the phenomenon before us, we shall proceed to trace out other auxiliary causes. A second prominent cause, which we therefore notice, is the prevalence of peculiar winds; for the translations of large portions of the atmosphere from one parallel to another must always be regarded as one of the most powerful causes by which the transparency of the air is affected; and, as before observed, a north-westerly wind, (from obvious causes,) brings with it a smaller supply of moisture than belongs to the mean hygrometric condition of the air in this region, and is hence always attended with a transparent atmosphere, so the very reverse is occasioned by easterly and southerly winds which obscure and thicken the air. The humid effects of particular winds are however greatly modified by local circumstances—a celebrated naturalist remarks, "that the sky of Xalappa in New Spain, which is beautiful and serene in summer, assumes a gloomy appearance from the month of December to the month of February; whenever the north winds blow at Vera Cruz, the inhabitants of Xalappa are enveloped in a dense fog, and the thermometer then descends to 45 or 50 degrees;" (on our coast the haze is produced by a warm current from the south, hence the thermometer rises with us instead of falling.) So at Lima, in Peru, the cloudy state of the air begins about the middle of July, and continues to the end of November, the wind blowing chiefly from the south and south-east. The third cause which we shall notice as concerned in the production of the Indian summer is the elevation and depression of atmospherical strata; this effect is sometimes produced by electrical agencies, by elevation and conformation of country, but more generally and extensively than either by changes of temperature at the earth's surface, for it is a well known fact, that the air, being a diaphanous body, can receive no direct heat from the solar rays, but becomes warmed only by the contact of its lower stratum with the earth's surface, which portion when rarified ascends and gives place to a cooler descending one: this remains below, until its thermal condition is again altered, when it re-ascends, thus establishing a constant circulation and perfect admixture of the different strata of air. That electrical agencies are concerned in the elevation and depression of atmospherical strata, there can be no doubt, but we are aware that the immediate and more extensive operation of this cause is in tropical latitudes. Thus Humboldt, in his personal narrative, remarks, "that the rainy season takes place within the tropical regions, when the causes which concur to produce a mixture of the atmospherical strata operate with the fullest effect; for instance, when the sun approaches the zenith of any particular parallel, the trade winds become less regular, the temperature increases, and the causes which contribute to the humidity of the atmosphere act with fullest vigor. The superincumbent columns of air are soon saturated with vapor, the production of which is accompanied by a great accumulation of electricity in the higher regions of the air; at length an intermixture of the strata begins to take place, produced chiefly, it would appear, by electrical explosions; the precipitation of the condensed vapor commences, and proceeds, (especially during the day,) with scarcely any intermission. The rain now descends in vast sheets; the rivers, raised above their ordinary level, can no longer be confined within their banks; and the supply they receive from the clouds exceeding the discharge by their channels, they spread far and wide over the adjacent fields, aad exhibit on every hand a dreary expanse of muddy and discolored waters. This state of things undergoes little alteration until the sun returns to the signs of the other hemisphere; at that period the aerial currents from the homonymous pole are renewed, and the air which flows from it being very far from the point of saturation, the rains cease, and the sky resumes its former clearness and serenity."

From this detail of facts, it appears to us highly probable that electrical causes are negatively concerned in the production of the Indian summer; for instance, as during the warmer months they act vigorously by producing an intermixture of the different currents or strata of air; so, on the contrary, at the approach of winter, they act with diminished energy, and hence suffer portions of air, differing greatly in their temperature and humidity, to remain for a length of time without flowing into each other. We might mention evaporation as one of the causes concerned in the production of haze or clouds, but as it is dependent on, and influenced by, existing temperatures, we shall, in summing up our arguments, show how far the mean hygrometic condition of the air is effected by the annual change of temperature, as also by particular winds, and by the local conformation and geographical position of the adjacent country. Having now noticed the more prominent causes concerned in the production of the phenomena of the Indian summer, we proceed to explain, as far as possible, their mode and extent of operation.

The first important conclusion that we draw from the above details is, that the formation of haze or clouds, viewing the subject in its most general outline, must depend essentially on a reduction of atmospherical temperature, which brings the water contained in the air to a visible sub-vaporous state, consti-

tuting haze, or to an actual liquid condition, (minutely divided,) forming clouds. We believe further, that this visible alteration, or increased density, is confined chiefly or wholly to the lower stratum of air, and is immediately referable to partial and slow currents of moist winds from a southerly or south-easterly direction, (as meteorological records confirm,) and that these moist winds usually follow cool dry westerly or northerly ones, which having prevailed extensively both in the higher and lower regions of the atmosphere, have lowered its temperature and reduced its absolute quantity of moisture. Now, if we suppose this moist and warm current of air, (extending perhaps in height some hundreds or even thousands of feet above the earth's surface,) to come into contact with a cool dry northerly one, the obvious result would be a reduction of temperature, attended with hazy or cloudy formation; while the superior stratum of air being altogether westerly or northerly, would remain dry and cloudless, which is, in fact, the precise condition of things during the Indian summer.

It might be asked whether those partial currents do not occur in the spring and summer season, and if so, why not give rise to the same phenomena? The reply would be, that the general tendency to foggy or cloudy weather is obviously less at those seasons than in the fall, from the existence of a cause which we mentioned in the early part of this paper, viz., that the mean temperature of the air being on the increase during the spring and summer seasons, (from the more direct action of the solar rays on the earth's surface,) its capacity to receive moisture and contain it invisibly is also augmented. Hence, an easterly wind will not produce rain, nor indeed sensibly affect the transparency of the air, until it has continued for such a length of time as to bring a great excess of moisture; when the solar heat becoming also obstructed, a further reduction of temperature and consequent precipitation occurs. And again, two other very important agents concur to prevent these phenomena from appearing in warm weather: we allude to the excessive heat at the earth's surface acting on the lower stratum of air, and the vigorous movement of electrical agencies on the higher regions, both of which causes concur to produce a constant and steady admixture of the atmospherical strata; the former, by rarifying the lower stratum and causing it to ascend; the latter by exploding and destroying large portions above, and reducing the temperatures ofothers, which as rapidly descend, and it is this activity of circulation among the currents of air during warm weather, that prevents the formation and continuance of a hazy or foggy atmosphere.

In confirmation, we may remark, that during the cold summer of 1816, when of course both these causes were acting with a diminished force, there was a very constant haziness of the air, so much so, that the sun could be viewed with the naked eye until 9 or 10 o'clock in the morning. A celebrated traveller in the south relates a fact which will convey some idea of the actual condition in which we suppose the lower stratum of air to exist during the prevalence of hazy weather; he remarks "that over the ocean the sky exhibits a paler blue than over the land; when from the summit of the Andes the eye is directed towards the great South Sea, a haziness uniformly spread to about 10,000 feet in height is observed to cover as with a thin veil the surface of the ocean—this appearance takes place in a season when the atmosphere viewed from the coast, or at sea, appears pure, and transparent; the existence of the opaque vapor is announced only to mariners by the little intensity of the azure color of the sky." Here it is evident that a slight additional density in this lower stratum would intercept a large portion of solar light, and give a turbid or hazy appearance to the general atmosphere.

By a very careful reference to Capt. Brantz' meteorological tables, we find, that in a very few instances, he notes hazy weather co-existing with a northerly wind—this fact, however, does not militate against the view we have offered, viz., that hazy weather is the result of a southerly or easterly current, supervening to a cool northerly one—for it is evident the same result would be produced if the differing portions of air only come in contact—with this qualification, that the superior dryness and force of a northerly wind would give a much shorter duration to the existence of haze, the continuance of which would be incompatible with a dry westerly or northerly wind.

We shall now proceed in a very general manner to inquire, why the Indian summer makes its appearance more particularly at the close of autumn. This part of our subject, by no means void of difficulty, appears capable of solution in the following manner. It is well known that a constant and general wind prevails within the tropics, moving round the earth from east to west, called the trade wind; observation also confirms that without the tropics, both north and south, the prevailing winds are westerly: the object of which appears to be a restoration of the equilibrium, which is disturbed by the trade winds—this westerly or north-westerly current, (for it would be oblique in our parallel,) being often counteracted during the summer by opposite winds, (brought into existence by local causes—and the direct action of the solar heat on our continent during the summer, and early part of the fall,) comes to act again with renewed force, during the first cold weather of autumn, and continues at intervals until it has, as it were, more than fulfilled its intention, and is hence usually succeeded again in November and the early part of December, by what may be termed a southern re-action—at which period the phenomenon of the Indian summer occurs, being at the precise time when the general predisposition of the air to form haze or fogs is at its maximum.

It appears to us also, that the existence and duration of the Indian summer in this country has an important connection with the extensive forests and uncultivated lands, peculiar to America, and it is worthy of remark, that according to the recollection of our older inhabitants, its former duration was often three or four weeks, whereas its present continuance is short and uncertain, seldom exceeding ten or fifteen days. It appears further, that this decline has been somewhat regular, keeping pace with, and evidently influenced by, the gradual uncovering of the country. Humboldt states, that plains abounding with trees are usually characterized by a foggy atmosphere. This is particularly the case with Brazil and Guiana, and the great central basin of South America, which receives the waters of the Amazon. In the middle of a continent overspread with forests, and watered by equatorial rains, the humidity is nearly the same as on the ocean.

The temperature of the atmosphere diminishes at an average of one degree for every three hundred feet, hence the humidity is greatest in the lower regions. The hygrometric condition of the air also varies, (of course,) with different elevations of country, the more elevated possessing the drier atmosphere. Again, in tropical latitudes the clouds form at a greater height above the earth's surface, because the point of condensation or congelation is confined to those cold elevated regions, whereas in the temperate zones, (and especially in the fall season, when the mean temperature of the air is but a few degrees above the point of deposition,) fogs and clouds form near the earth's surface—all these facts, if closely examined, corroborate the views we have been trying to establish—but which we confess are too imperfectly and theoretically founded.

One of the most remarkable phenomena of the Indian summer is the peculiar redness of the sky, which in our opinion is explained on the principle that the white beam of light being unfolded in its passage through the foggy stratum near the earth's surface, its more delicate rays are either reflected back, or absorbed, while the stronger rays of red and orange all penetrate to the earth's surface, and by their excess tinge surrounding objects with their own color, and especially the lower atmosphere, which reflects and refracts them in every possible direction: much on the principle that, to the eye of a person who has descended to a great depth in a diving bell, every thing appears reddish, because nothing but red rays can penetrate the dense medium which is interposed between him and the sun. Again this redness of the air, together with the mechanical irritation produced by the denseness of the aerial vapor, excites a painful affection of the eyes—this sensation, connected with the smoky appearance of the sky, induces great numbers of the inhabitants of this country to believe that the Indian summer consists of a smoky state of the air, produced by burning the vegetable decidua which are collected together in the fall season for this purpose, or, as some will have it, the firing of the neighboring mountains. This appearance of actual smoke is however an optical illusion, produced by the foggy appearance of the air, and which seems to find confirmation by the great irritation of the visual organs, effected by the excess of red rays, &c.

The increased temperature which accompanies the existence of this hazy weather is referable to several causes, viz.

1st. The prevailing wind, which, being from a southerly direction, is usualiy warm.

2d. The heat radiated from the earth's surface is immediately returned, (on a well known principle,) being reflected back by the haze of the atmosphere, while lastly the temperature is further increased by the condensation of both air and moisture during the formation of the foggy stratum.

We have now hastily explained, or rather touched upon the leading phenomena of the Indian summer, but acknowledge to have written on this subject rather with a view to elicit further inquiry from others than to establish any theory of our own; every phenomenon connected with the earth's atmosphere is highly deserving of our most earnest investigation, for daily observation confirms, that not only the health, but also the moral quali-

ties of our species, are greatly under the control of its influences. We hope therefore to see this subject taken up by some one whose time and opportunity are less restricted than our own, and whose superior knowledge of the laws which direct and govern our atmosphere shall enable him to place it on more sure and elevated ground.

Destroying the Worms which attack Fruit Trees: by M. De Thosse.—We are indebted to Mr. Silliman's Journal for a translation of the following.

Unforeseen circumstances often lead to useful discoveries. One fact or discovery leads to another, and may form eventually a succession which constitutes the chain of our knowledge.

Agriculture is one of those pursuits in which theory should be combined with practice, and those who follow it ought to be duly sensible of the many things which, in its various branches, it is still desirable should be found out.

Among these desiderata are the means of removing from our fields, gardens, and orchards, that multitude of destructive insects which blast our hopes and the fruits of our labors.

I do not find in the various processes which have been published for banishing these hostile armies, the use of a substance which I have found to be a strong poison to all sorts of insects. I have employed it in certain cases; its use may perhaps be much extended. The reasonableness of its price, and the rapidity of its execution in the several cases in which I have used it, seem to claim for it the attention of agriculturists.

This substance is the spirit of turpentine. I was led to try it by observing that certain plants which have naturally a strong odor, are not infected with insects. Such plants, however, cannot always be immediately obtained, nor is it common for them to emit so strong and penetrating an odor as spirits of turpentine.

Wishing some years ago to raise four young puppies, I perceived them, when a few days old, to be very languishing, and discovered that they were full of insects or lice, which were preying upon them. It was in vain that they were combed,—new generations succeeded, or were renewed from the mother, and the little animals were on the point of perishing. I then took it into my head to sponge both the mother and the pups with warm water impregnated with spirits of turpentine, and soon found to my agreeable surprise that every turn of the comb brought out numerous dead insects. The little animals soon acquired vigor, and were saved by a single repetition of the process during the course of the summer.

I tried the spirit on various insects. Lice when touched with it on the point of a pin, made a few rotary bounds and fell down dead. Bed bugs, anointed with the same fluid, after a few steps, turned on their backs and died. A green, gilded insect, as large as a bean, which attacks pear trees, was touched and died immediately, although another insect of the same kind lived a long time in warm quick lime.

Butterflies, flies, caterpillars, May-bugs, die more or less promptly when attacked with it.

Having learnt these facts, I soon found occasion to try its effects on some of my trees, which were attacked by a multitude of worms. These I destroyed entirely by putting into a bowl a few handfuls of earth on which I poured a small quantity of the spirit, then adding water, and stirring the whole together until it had a proper consistence to be rubbed or brushed over the ends of the branches. The insects perish with their germs; the odor remains several days about the tree and repels fresh invaders. A mixture of earth is necessary, because spirits of turpentine swims upon pure water, and will not mix with it, and if used in too great quantities might burn the leaves.

The drought which occurred a few years ago in the canton in which I live, produced a mange in cattle and horses, very extensive and injurious, and those which escaped this infection were filled with lice, from which they were promptly relieved by sponging earth with water impregnated with the spirits. This infection caused horses, fatigued with labor, to rub themselves so much against their mangers, and the walls of the stables, as to deprive them of much of the rest so necessary to their comfort.

I cannot, therefore, doubt, from the trials that have been made, that much benefit might result from the use of turpentine in clearing fields and trees from insects of different kinds, and that a mixture of ashes with which a portion of this liquid has been incorporated, would remove by its odor the ticks and other insects which infest turnips. Its odor is more penetrating in the open air than that of sulphur and some other materials used for this purpose.

It would perhaps be useful in destroying ants or driving them away from espaliers and other places. These insects are very fond of the slime or honey left by grubs, &c., on trees and plants attacked by them.

The essence now recommended is of so moderate a price and is used in so small a quantity as to be accessible to every body; and it is moreover an article that ought to be found in all farm and country houses, from its being so good a remedy for the wounds and accidents to which horses are liable, and for the feet and horns of cattle.—[Jour. des Conn. Usuelles.]

Comparative Trial of Walls of different Kinds.—The Caledonian Horticultural Society has published a garden report, dated June 1, from which it appears some trials have been made of the difference of temperature between a sloping wall inclined to the horizon at an angle of about 50°, a wall colored black, and a perpendicular wall; and between perpendicular walls of freestone, whinstone, (basalt,) and brick. It appears that the sloping, the black, and the freestone walls, all indicate the same temperature at 6 o'clock in the morning; but that the average temperature of the brick wall, at that early hour, is, during April, a degree colder. The brick wall, however, being more porous, and retaining a greater quantity of heat, has shown, during May, a considerably higher temperature than any of the others, owing to the increased influence of the sun. At 1 o'clock, P. M., the average temperature of the sloping wall is 7° higher than that of the brick wall. The next warmest at that hour is the dark-colored or whinstone wall, which is 3° lower than that of the sloping wall. At the same hour, the freestone is 5° colder than the sloping wall, or 2° inferior to the whinstone. At 6 o'clock, P. M., the sloping wall is 2° warmer than the freestone and the brick walls, and 5° warmer than the whinstone wall, which last, at that time, is the coldest of all the walls. The results will be more satisfactorily ascertained when the fruit of a cherry tree, a vine, or a peach, trained on the sloping wall, have been compared with that of one of the same kind placed against the perpendicular freestone wall. When hoar-frost forms, the sloping wall becomes the coldest during the night, by 2° or 3°, or perhaps more. To render it effective, therefore, it will be indispensable to have a covering of thin canvass drawn over it during the night.—[Loudon.]

Use of Hot Water at Wallington, the seat of Sir John Trevelyan, in Northumberland—90 loads of coals, out of 220, were saved the first year. The value of these coals, including carriage, is about 6s. a ton. Instead of nine fires to four houses, there are now only two fires. The level system of circulating the water is adopted, and the work was executed by Mr. Cookson, iron-founder, of Newcastle.—[T. July 8, 1834.]

The Faculties of Mind necessary to form a Botanist.—Dr. Daubeny very correctly considers him "a botanist whose mind is embued with the great principles by means of which plants can be collected into natural groups, and who strives to discover the general relation in which these groups stand toward each other; in short, who labors to construct a method, where the very place which a plant occupies in it shall, in a manner, announce its most prominent characters, the qualities it may possess, and its affinities with others. We hold the pertinacious attachment to the artificial system to be the cause of the low degree of estimation in which botanical science is, therefore, deservedly held in this country. If we are right in this opinion, it is certainly greatly to be regretted that that which was formerly dignified with the name of botany should yet linger in our schools, or that any should be found to teach it, since there has arisen in its stead a science which is beautiful, philosophical, and capable of the most varied and useful applications; capable of being applied to medicine, horticulture, entomology, chemistry, and, above all, to climatology, and, consequently, to geology. The method of Jussieu does, for the vegetable kingdom, that which the method of Mac Leay does for the animal, viz., by putting us in possession of a single fact, or a few facts, it confers upon us the power of inferring many more, relating not only to the structure of the plants, but to the juices circulating in the vessels, and the products elaborated therefrom. If something more than the *name* of a plant be to be comprehended in botanical arrangements, let us imitate the example of Linnæus, who, conscious of the inadequacy of his artificial system to serve the cause of genuine botany, wisely abandoned it, and devoted himself to devising a natural method, and called upon all botanists to assist in accomplishing so desirable an object. Let us no longer cling to this system, which has been expelled from almost every other country of Europe, but rather let us cast it, like an idle weed, away, which cannot be suffered longer to deform the fair garden of philosophic truth."—[London and Edinburgh Philosophical Journal, vol. v., p. 76.]

THE IRISH FURZE, (ULEX EUROPÆA, VAR. STRICTA,) AS A FORAGE PLANT.—It has recently been found in Caernarvonshire, and other parts of North Wales, that this variety of the common furze may be more profitably cultivated in the field than the species. The reason is, the branches, when cut for use, do not require bruising before being given to horses or cattle. As this variety very rarely produces flowers or seeds, it is propagated by cuttings, which, however, strike in a bed of sandy soil as readily as willows. The cuttings should be taken off in the autumn, of the present year's wood, and they need not be above 3 inches long. They will be fit to transplant in the March or April following, and in the succeeding autumn they may be cut over with the scythe for the first time. We consider this a very interesting fact, and one which shows that it is from varieties, and hybrids, and even from monstrosities, which this is, that we are to procure the most valuable plants of culture. This has been well pointed out in Bishop's Causal Botany.—[Gardener's Magazine.]

FLAX.—The common flax is cultivated every where in India, but only on account of its seed, the mucilage of which is used in medicine, and the oil in the arts. The stalks of the plant, which in other countries are most valued, are in India thrown away; and other plants, such as Hibiscus cannabinus, and Crotalaria cannabina, are cultivated almost in the same field, for the very products that the flax would yield.—[Ib.]

OBITUARY.—Died, at Armagh, June 30, aged 42, Mr. James Elles, gardener to His Grace the Lord Primate. Mr. Elles was a native of Yorkshire. At an early age he was sent to a grammar school, at which he read the usual course of Latin and Greek, which, in after life, assisted in placing him at the head of his profession. He discovered an early attachment to the profession of gardening, and, being a man of studious habits, he not only became a good practical gardener, but also an excellent botanist, and a successful cultivator of flowers. He contributed, under different signatures, many valuable papers to the Gardener's Magazine, and obtained the prize offered by the conductor of that periodical, from a great number of competitors, for the best essay on "Cottage Economy." He had acquired not only a theoretical, but also a practical knowledge of many branches of natural history, and was, we believe, the first gardener in this country who used hot water to keep up the proper temperature of hot-houses. He lived as head gardener ten years with the Marquess of Bath, and upwards of four years at Armagh. In him society has lost a valuable member, and His Grace has lost a servant of sterling honesty and integrity, one whom it will be a most difficult matter to replace. He bore a lingering illness with Christian resignation, and died in the full hope of enjoying a happy eternity through the merits of our Lord and Saviour Jesus Christ. He has left a disconsolate wife and four children to lament his loss.—[Newry Commercial Telegraph, July 8, 1834.]

We can add our testimony to the great moral worth and high professional eminence of Mr. Elles, the loss of whom we deeply deplore. We sincerely hope that the archbishop whom he has served will act the part of a Christian, and be a benefactor and protector to his widow and children.—[Loudon.]

TIMBER—YANKEE ENTERPRISE.—From the Portland Courier we learn that a company residing principally in that city have purchased a tract of 700,000 acres of timber land, in Georgia, with the intention to furnish from its resources a constant supply of lumber of every species, to answer the increasing demand in the country and abroad. The growth of timber is chiefly the long-leaved yellow pine. The depot is to be at Darien, near the mouth of the Alatamaha. The Company has already in operation four mills, containing 18 saws, together with a flour mill, and a well stocked plantation around the mills. The laborers employed are chiefly from the north, and a reinforcement of nine hardy and industrious Yankees took passage at Portland last week for Savannah.

The Alatamaha, about 100 miles from its mouth, divides into two larger branches, which are named the Ocmulgee and Oconee rivers; upon the latter is situated Milledgeville, the capital of the State, and upon the other, equally distant from the junction, the flourishing town of Macon. Between these large rivers, within the limits of steam navigation, within 50 miles of the capital, and in the very centre of the State, lies the large tract of land purchased by the above-mentioned Company. Two steamboats, plying on the Alatamaha, pass within a mile of this property.

MULBERRY TREES.—The successful cultivation of the Chinese Mulberry, Morus Multicaulis, is exceeding even the sanguine expectations of its friends. The plants which are growing from cuttings in this town are now from four to six feet in height and covered with foliage almost as large as cabbage leaves. Many of them are eleven inches long and nine broad, and some have been seen as large as eleven by fourteen. The plant seems adapted by nature for the very use to which it is applied, the feeding of Silk Worms. It rarely exceeds ten feet in height, grows with rapid growth, and puts forth its immense leaves the moment the stem rises above the ground. When propagated from the seed, the first year they are not so large as from cuttings; but even from the seed they almost stagger credulity. The Secretary of our Agricultural Society has some plants growing about three feet high, with leaves eight inches long and six and three quarters broad. Some plants cultivated by another gentleman from the Chinese seed, sown this spring, are higher, and with leaves even larger, and if the season continues favorable, will yet measure twelve inches long and nine inches broad. The leaves of the common Mulberry every body knows are diminutive in size, and, compared with the Chinese, are not worth cultivation.—[Northampton Courier.]

CORN ON OAK—CURIOSITY.—Mr. Philip Taft, of Smithfield, has presented us with a branch of a shrub oak, on which are several ears of corn now growing! It was taken from a field of corn in Smithfield, and is a rare curiosity to us, and may be to others, if they will take the trouble to call at our office. The grains of corn are in perfect shape, but the substance is similar to that of an oak apple. It is thought that the flour of the corn lodged on the oak and *amalgamated*, and this produced the *fruit*, as uncommon as it is curious.—[Woonsocket Patriot.]

WHEAT ON CLOVER SOD.—I am induced to lay before the public my actual experience in raising wheat on clover turned in, not because there was the greatest yield, but to encourage others to do likewise, and if possible render Maine independent for that necessity of life, BREAD. About the 10th of November last, I paced off what I supposed to be about one acre of land, that had been mowed two years, which had been seeded to herds-grass and clover, principally clover, and had yielded a good crop of that kind of hay the two previous years, say about two tons each year. The soil may be called a sandy loam, inclining to clay. In the spring, at the usual time, it was sowed to wheat, partly Malaga, and partly what is called lake wheat—when ripe it was gathered, and there were two loads of nearly equal size, one of which I have thrashed, which gave about 13 bushels, if the other was 12, there were 25 bushels—this induced me to have the land measured, and I found it lacked (taking out for stumps, &c.) 20 rods of an acre; adding for the 20 rods at the same rate, three bushels and a half, and we have 28½ bushels to the acre. I put on, after the land was rolled down, one and a half bushels of plaster, and no other manure was used. It is well seeded to clover, and promises a good crop for two years to come, and then as good wheat as this year. I think I could have ploughed it for - $2,50
Seed and sowing - - - 3,00
Harrowing in and rolling - 1,00
Harvesting - - - - 2,50

Expense - - - 9,00
28 bushels of wheat at $1,25 35,63

Balance - - $26,63

It will be seen that I have not charged the thrashing, nor have I included the straw as fodder or manure. It will also be perceived that I have not charged the plaster, as I expect much more benefit than it was worth to the succeeding crops of clover. ELIJAH WOOD. Winthrop, Sept. 15, 1834.—[Maine Farmer.]

A BRILLIANT AND USEFUL VARNISH FOR ARTICLES OF CAST IRON.—Suspend the article by a bent wire, and give it, with a brush, a thin coat of linseed oil, then hang it eight or ten inches above a wood fire, so that the smoke and flame may frequently play around it. After being thus exposed over a good fire during a full hour, bring it down very near the burning coals, without touching them; after it has thus remained about fifteen minutes, dip it into cold spirits of turpentine.

If this single operation does not give it sufficient brilliancy, it may be heated again over the coals and dipt a second time in the spirits. —[Jour. des Conn. Usuelles.]

RECIPE FOR THE BEVERAGE CALLED IMPERIAL POP.—Put into an earthen pot two pounds sugar, two lemons cut into slices, and two ounces of cream tartar. Add nine quarts of boiling water, mix the materials well, cover the vessel with a stout cloth, and let it cool.

When cold, spread two table-spoons full of good yeast from beer on a thin slice of bread, and put into the vessel, which must be covered as before, and left till the next day. It may then be filtered through a fine cloth, and bottled and corked tight in strong bottles. In the course of three or four days the fermentation will be nearly complete, and the liquor may be drunk.—[Ibid.]

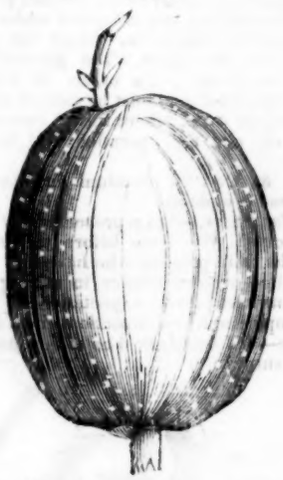
Large English Gooseberries. By M. Saul.

[For the New-York Farmer and American Gardener's Magazine.]

This month is the season for our gooseberries; the crops are good, and the large sorts have swelled well, but not yet quite ripe. I send you the size of three of the sorts now on the trees in my garden, so that you may form some idea what our Lancaster gooseberries are in appearance on the trees.

The gooseberry trees produce the largest fruit when about 3 or 4 years old; that is, I mean from cuttings. After that time the tree increases in size, and in course produces more fruit, so that a gooseberry grower for showing takes care to provide himself with a succession of young trees.

No. 1.



No. 1, Wonderful, red berry, weighed 27 dwts. 13 grs.; No. 2, Fox Hunter, red, weighed 26 dwts. 2 grs.; No. 3, Peacock, green, 25 dwts. 8 grs.

M. Saul.

Lancaster, July 7, 1834.

Effects of Electricity on Plants.—Many experiments in electrifying plants have been made by M. Nunenburg and the Abbe Nollet. According to the reports of the former, most of them increasen in height, and flourished far beyond others not electrified. Some bulbous roots, he says, which had been frequently electrified, grew eighty-two lines and a half, whilst others of the same species, not electrified, grew only fifty-two lines and two-thirds. But the report of Abbe Nollet is not so favorable; he found that the plants electrified by him made vigorous shoots at first, but he thought the perspiration being by these means too much increased, their juices were too quickly dissipated. Hence the plants became gradually weaker, and at length prematurely perished. We yield due credit to both these reports, though they seem, in some measure, incompatible with each other. It is possible the experiments were made on various plants, at different seasons.—[Horticultural Register.]

Implements of Agriculture.—Every good husbandman will lay it down as a rule to have an inventory of all his agricultural implements and other articles necessary for the cultivation of his farm, and frequently inspect them, that he may be sure the requisite repairs are made in due time. An implement, likewise, that is not wanted during the season, ought not only to be carefully housed, but before it is put aside it should be well cleaned, made perfectly dry, oiled, or if made of iron painted, and kept so as to be ready when wanted.—[New-England Farmer.]

[From the Mechanics' Magazine, for October.]

Seventh Annual Fair

OF THE

AMERICAN INSTITUTE,

HELD AT NIBLO'S GARDENS,

October, 1834.

It is with no ordinary satisfaction that we again bring before the notice of our readers some of the most useful and important inventions, improvements, and displays of American ingenuity and industry, exhibited at this annual fete—an exhibition in every way honorable to us as a nation, and calculated by the competition it offers, and the rewards it bestows, to render us able in a short time to vie in all our manufactures and mechanical skill with any nation on the face of the globe.

America has great reason to be proud of her numerous institutions for fostering talent and ingenuity, her seminaries of learning, and her philanthropic institutions in every section of the Union, but to none will posterity be more indebted than the institution now under our notice. It promotes a taste for the cultivation of the arts and sciences—gives a spur to industry among all classes—and has been the means of bringing into notice individuals of modest merit, who without a similar institution would have known full well

> how hard it is to climb
> The steep where Fame's proud temple shines afar,
> ——————how many a soul sublime,
> Has felt the influence of malignant star—
> And waged with fortune an eternal war,
> Checked by the force of pride, or envy's frown,
> Or poverty's unconquerable bar."

It offers, too, by its annual exhibition, by the meeting of so many of the ingenious and scientific of our land, an opportunity for the interchange of ideas, which must afford them great gratification, and when guided by those feelings of patriotism which will ever be found predominant in the breasts of men of talent, must be productive of great benefit to our country.

We are gratified to learn that the number of visitants this year quite equalled that of any former one, and we most cordially wish that this, as well as institutions of a similar nature, may "go on and prosper."—[Ed.]

List of articles exhibited.

Steam Engine and Sugar Mill—Cylinder, 2½ inches bore, 4½ inches stroke; walking-beam, 13½ inches long, from centre to centre; connecting rod, 13¼ inches long; crank, for connecting rod, 2¼ inches long; fly wheel, 16 inches diameter; air pump next to cylinder; force pump in the centre; injection and feed cocks between the two centre standards; feed pipe from boiler to feed cock; boiler, 22 inches long, 13 inches diameter, of copper.

Spur wheel for sugar mill, 16 inches diameter; pinion, 1¾ inches diameter; 3 rollers and stands for sugar mill; rollers, 5½ inches long, 3¼ inches dianeter; the driving wheels for rollers are the same diameter from the pitch line as the rollers. This mill is connected with the engine by a coupling attached to the spur wheel, which works in the pinion attached to the fly wheel of the engine.

The Draught and Model of a Ship, 420 tons, drawn by C. G. Selfridge, of Boston, representing 4 different plans of the ship. 1st, Sheer plan, which represents the ship as looking upon her broadside; shows the place for the masts, the shape of the cut-water, rudder, &c.; also, of the section lines, diagonal lines, bearding line, throat of the floors, &c. 2d, A half-breadth plan, which represents the ship upside down, shows the shape of all the water lines; main and top breadth, &c. 3d, Square body plan, representing all the square frames of the ship in their proper shape and place, with the diagonal section and water line struck upon them, also the height and length of the main transom, with the upper and lower edge of all the other transoms, struck across the frames to lay them down in the half breadth transom place. 4th, Cant body plan, representing all the forward and after frames canted into their proper places, showing the shape of all the cants, and the fashion piece, the size of all the transoms, and the place for the heels of the cants in the dead wood. Dimensions of ship—126 feet on deck, 26 feet beam, 19 feet deep.

The model was made to order, or the beam would have 28 instead of 26 feet.

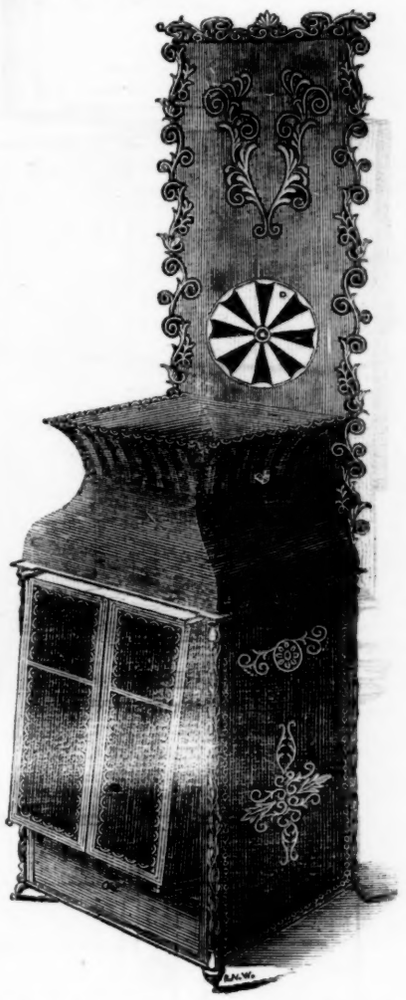
Likewise, the Model of a Steamboat, for sea, with spandings under the guards, for the double purpose of preserving the guards from the force of the sea, and making the boat more buoyant. Made by Selfridge. Dimensions—181 feet on deck, 24 ft. beam, 48 ft. from out to outside of guards, 10½ ft. deep, wheel 22 ft.

Stoves, &c.

H. Nott & Co. 1st premium on anthracite coal Hall and Cooking Stoves—a silver medal.

J. L. Mott, 2d premium for anthracite coal Cooking Stoves—a diploma.

W. Naylor, 2d premium for anthracite coal Hall Stoves—a diploma.



Naylor's Newly Invented Hot-air and Self-ventilating Stove—an entirely new article, embracing principles which the inventor has never known to be applied to any other stove; they are recommended with the greatest confidence, and warranted to perform well in every respect, or no pay demanded. Heat

can also be applied to other rooms from the same stove when required. The demand for them last year was greater than could be supplied in time, and they have undergone a very great improvement this year, both in utility and appearance, which is a farther recommendation.

J. L. Mott, 1st premium for Office Stoves—a diploma.

James Wilson, 2d premium for Office Stoves—a diploma.

N. Whitman, 1st premium for Parlor Grates—a silver medal.

Edward Smylie, 2d premium for Parlor Grates—a diploma.

F. Van Tassel, for a Cooking Stove—a diploma.

B. H. Folger, for anthracite Globe Stoves—a diploma.

Joel Curtis, for a coal Cooking Stove—a diploma.

Richards & Damerel, Cooking and Office Stoves—a diploma.

Platt & Treadwell, Albany, Parlor Stove for wood—a diploma.

H. S. & J. S. Gold, 1st premium for Portable Bake Ovens—a diploma. This oven is constructed for preventing the loss of heat, being made double, (the material of tin or other thin metal plate,) with a distance between the two of from three quarters to an inch, so that between the two casings on the top, and on all sides, there may be confined air. This construction of the oven gives it firmness and durability.

The furnace is in the centre, between the doors or ends of the oven, passes through it, is put in at the top, and projects a little below the bottom. The fuel is put in at the top, which has a cover, (as represented in the first cut;) the draught enters (as represented in the same cut) in front, just under the bottom. The sides of the furnace are represented in the second cut, by the two lines near the centre. The circle represents the smoke or gage pipe, which ascends behind the oven. The furnace is about two inches thick, is nearly as wide as the oven, so that it divides it into two parts: it holds about eight quarts of coal, which is sufficient to bake at least *thirty-two loaves* of bread. To prevent the heat from operating unequally, there is a contrivance introduced for regulating the heat, by producing what is called by the inventor, "the circulation of heated air." Those several pieces running parallel with the furnace, and near it, represent a *vertical partition*, in so many pieces. The air between this partition and the furnace becomes immediately heated; it then rises, of course; and as each piece of the partition is set back towards the furnace a proportionable distance, (as is seen in the cut,) the heated air will enter between the several shelves and pass towards the door over the articles on one shelf and under those on the other, by which the heat will be absorbed, so that the air will become cooler when it reaches the door, where, by preponderance, it will ascend through the space (represented in the cut) to the bottom, when it will be re-heated, and so on. This contrivance for producing circulation has never before been known, and from this the oven derives its chief advantage, as it will operate equally well, though several stories high. In this oven the lower shelf is made double, containing confined air. This prevents what is on the shelf from being burned at the bottom. It is made thicker the front side next to the door, so that its under side may be an inclined plane. The furnace is round, and is located under this shelf, entirely in the oven, except the part which catches the ashes. The partition in this is the same as in the other. It will be seen that the heated air must be carried to the back side of the oven, where it will ascend as in the other, and the operation will be the same.

Fig. 1.

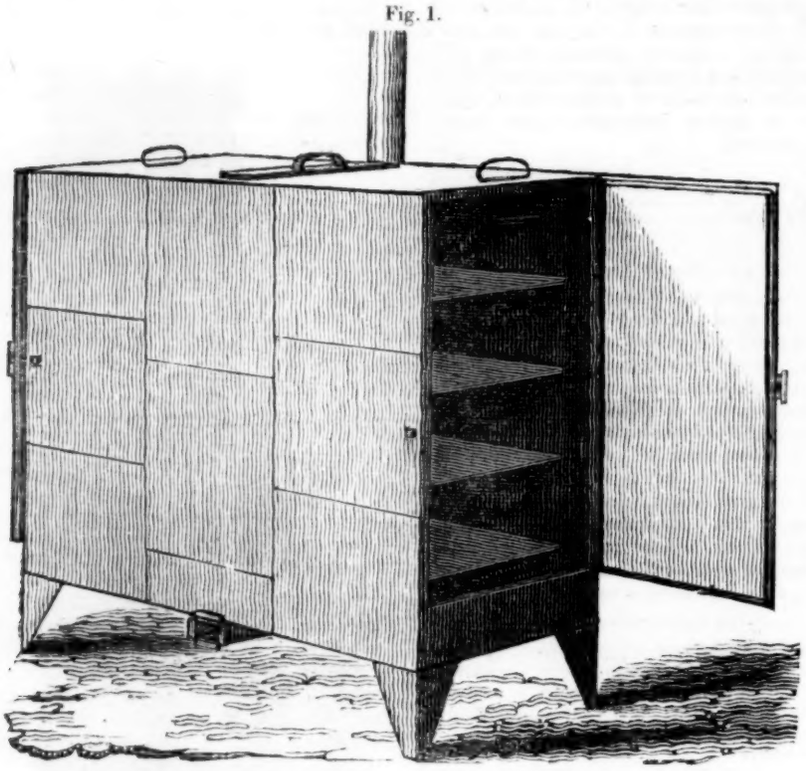


Fig. 2.

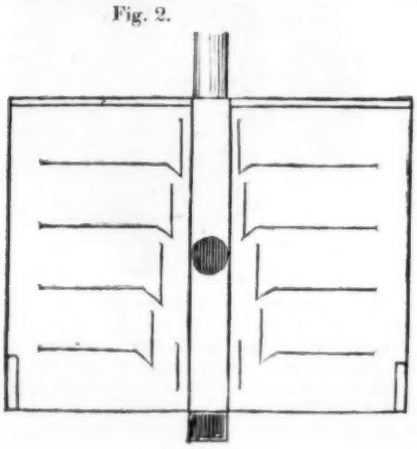
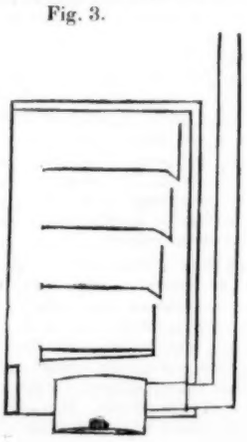
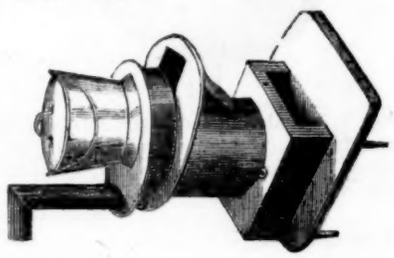


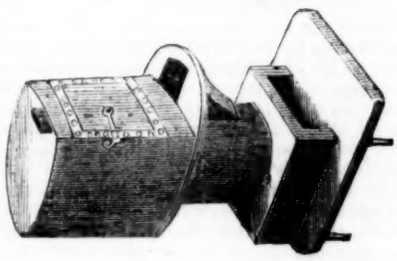
Fig. 3.

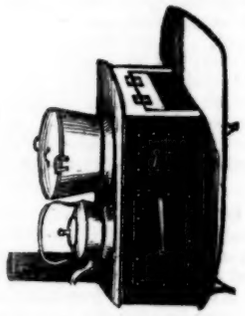


H. Nott & Co., 2d premium for Portable Bake Ovens—a diploma.

Graham's Stove,—as represented by the subjoined cuts. We have before us several testimonials from persons who have had it in use some time, who all concur in stating that it fully answers their expectations. It is cheap—simple in its construction—neat in its appearance—and economical as to the quantity of fuel consumed.







Naylor's Coal Cooking Stove, acknowledged the best article of the kind ever brought into the market. The demand having been extensive, and the improvements great this year, will be a further recommendation to it. The improvements are a greater increase and equalization of heat to the boilers, a greater facility

in cooking, economy in fuel, and a total preventive of the dust arising from coal.

A Model of a Cooking Stove, invented by Dr. Payne, 13 Beekman st., New-York; quite novel in its operation. The grate, or furnace, in which the wood, or coal, is burned, turns horizontally under a shallow heat chamber, of a circular form, on which the cooking vessels are placed, which enables the cook to put the most intense heat under the vessel, or vessels, that most require it, the burning surface of the fuel coming in immediate contact with the bottom of the vessels, whilst the heated air from the furnace, or grate, by an ingenious and compact arrangement, passes from the furnace under all the vessels, in a circle, before it escapes into the stove pipe, which is placed in the centre of the circle. The range, or grate, is so constructed as to afford ample and convenient room for roasting and broiling, without occupying a space more than 3 feet square. The stove may stand on legs, or be suspended.

Cabinet Ware.

J. C. Jenckes, a Carriage Chair for an Invalid—a diploma. A very ingenious contrivance, by which sick persons are able to move themselves from room to room, and also alter their position of sitting.

A splendid Perspective Pier Table, inlaid with upwards of one hundred and fifty pieces of wood of different shades and colors, so arranged as to appear like solid blocks or boxes, in whatever position you may stand to view it; manufactured by Wm. Fulcher, No. 88 Elm street, New-York.

W. Woolley, for a Sofa Bedstead, made by E. S. Woolley, and Frieze Window Covering—a diploma.

J. A. Patterson, fine inlaid top for Centre Table—a silver medal.

J. H. Farrand, for Spring Window Blinds—a diploma. Mr. F. exhibited a figure of a Pagoda or Temple, made in the form of a hexagon—as a model intended to illustrate at one view, by revolving on its centre, blinds for windows, both on an improved principle, and of original invention, and classed under the following heads:

Inside spring blinds, adapted either for linen, transparencies, maps, &c.;

Sun shades for outside, made to suit different forms of windows, which effectually screen the rays of the sun, and ventilate the rooms in hot weather;

Dwarf Venetian blinds, with vertical movement, striped Venetian and falling hood;

The painted Venetian blind differs from the old plan, inasmuch as it has an extra lath revolving on two rollers, centred in the top lath, which hangs in a horizontal position, thereby preventing the line either to cut or slip from the pullies, which being vertical to the holes in the slats facilitate the turning of the blind, besides effectually screening the rays of light.

Fine Arts.

Original Busts of McDonald Clark, the poet, and a Dead Infant, both sculptured by James V. Stout—silver medal.

These busts are stood on pedestals of the Scagliola marble, and are manufactured by Clark & Dougherty, 40 Hamersley street. They are, in point of strength, durability, richness of tint, vein and polish, fac similes of their originals, and what greatly enhances their value is the barrenness of the primitive quarries, among which are the lapis lazula, roseæ brosceido, yellow antique, &c., and the cost is from one-sixth to one-third of their models.

J. W. Dodge, 1st premium for Miniature Painting—a diploma.

J. James, 1st premium for Stained and Burnt Glass—a diploma.

Smith & Crane, 1st premium for Wood Carving—a diploma.

Mrs. Springsteel, 1st premium for frosted embossed Flower Work—a silver medal.

Miss Harris, 1st premium for Shell Flower Work—a silver medal.

W. J. Hubard, 1st premium for Portrait Painting—a diploma.

Edward D. Marchant, 2d premium for Portrait Painting—a diploma.

J. W. Hill, 1st premium for water colored Landscape and Marine Painting—a diploma.

Miss E. Johnson, 2d premium for water colored Landscape Painting—a diploma.

T. Chambers, 2d premium for water colored Marine Painting—a diploma.

Noel Delregney, 1s premium for Oil Landscape Painting—a diploma.

Hyatt & Smith, 2d premium for Oil Landscape Painting—a diploma.

W. Eagleson, 1st premium for Sculpture in Marble—a diploma.

R. J. Brown, 2d premium for Sculpture in Marble—a diploma.

George Endicott, two Portraits of Daniel Webster and Doctor De Witt, in Lithograph, a fine specimen of that art in point of execution and likeness—a diploma.

W. Thompson, 1st premium for Engraving—a silver medal.

George Bird, 1st premium on Imitation Wood and Marble—a silver medal.

E. Ramsbottom, 2d premium on Imitation Wood and Marble—a diploma.

Joseph De Groot, 2d premium on Imitation Wood and Marble—a diploma.

Town Davis, fine specimen of Architectural Drawing, (the New Custom-House)—a diploma.

Stephen H. Gimber, fine specimen of Mezzotinto Engraving—a diploma.

Miss Margaret Ackerman, for a Painting on Velvet—a diploma.

Miss Cornelia Loomis, aged 13 years, for 2 Wreaths Embossed Work—a diploma.

Books and Stationary.

The best specimen of Typography exhibited was Sparks' Life and Writings of Washington, exhibited by Monson Bancroft, from the University Press, Cambridge, Mass.

Second best specimen of Typography, Byron's Works, published by George Dearborn, elegantly bound by H. & H. Griffin.

Best specimen of Blank Account Books, exhibited by Wm. Minns; the ruling very neat and perfect, and the binding, particularly of two volumes, highly finished and in good style.

Second best specimen of Blank Books, by D. Felt & Co., four very elegant specimens, as to ruling and binding.

Best specimen of Book Binding; Books of Common Prayer, bound by L. Turner.

Second best specimen of Book Binding, by H. & H. Griffin.

Best specimen of Sealing Wax; a great variety of beautiful samples, plain and variegated colors, by D. Felt & Co.

Best specimen of Manufactured Quills, by D. Felt & Co.

Best specimen of Maps, by Mitchell, Philadelphia.

Second best specimen of Maps, by D. H. Burr, N. Y.; a large and elegant Map of the State of New-York, with Plans of the cities and most important towns in the State.

The following articles were worthy of particular notice:

The National Portrait Gallery, published by M. Bancroft, press of Wm. Van Norden. Al-

though it may be thought that this work falls more immediately under the department of the Fine Arts, this committee cannot omit to notice, with high approbation, the style of its execution, which is highly creditable to the publishers, and a favorable specimen of the progress of the arts in this country.

Book of Common Prayer, published by R. Bartlett & S. Raynor, press of Wm. Van Norden, a very neat and beautiful edition.

Mitchell's Reference and Distance Map of the United States, exhibited by C. Mould, agent, 155 Broadway, is a work which merits particular notice for its correct and handsome execution, and minuteness and variety of detail. It is accompanied by a volume (324 pages) of explanatory references, containing also a mass of important topographical and statistical information.

A fine specimen of Portable Writing Desk and Dressing Case, by Thomas Luff & Co.

Very superior Binders' and Paste Boards, by J. B. Cheeseman.

Music and Musical Instruments.

Rosewood Cabinet Piano Forte, No. 401, 6 octaves, with patent piccolo action, and cylinder fall, manufactured by Firth & Hall, No. 1 Franklin square. Silver medal.

One 8 keyed silver banded cocoawood flute, with patent roller springs, elastic cushion keys, and C & C silver plates;

Also, one 8 keyed silver banded cocoawood flute, with elastic cushion keys, common springs, C & C silver plates. Both the flutes manufactured as above.

Two Piano Fortes, by John Osborne. The only difference in the two musical instruments is, the one is what is called by makers French Grand Action, and the other English Grand Action. The above names are given them by way of classification or designation, as they are, in part, copied from those two nations, in their original mode of mechanism. Gold medal.

Bridgland & Jardine, 2d premium on Square Piano Forte—a silver medal.

Bridgland & Jardine, 2d premium on Cabinet Work, rose-wood Piano Forte Cases—diploma.

C. H. Eisenbrant, Baltimore, 1st premium on Flutes and Clarionets—a silver medal.

Rounberg & Schroeder, 2d premium on Flutes and Clarionets—a diploma.

C. G. Christman, for workmanship for an improved Flute—a diploma.

C. A. Eisenbrant, for a Brass Horn—a diploma.

G. Godene, for double Bass Viol—a diploma.

India Rubber Goods.

Captain L. Norcross' Water Dress—composed of a lead cap, which encloses the head, of 75 lbs. weight, and one foot in diameter, with a small glass in front, for the object of vision. The lower part has an opening, the edges of which rest on the shoulders and front and back of the chest equally.

The dress is made entire of India rubber cloth, with arms, gloves, legs, and feet, and made to fit loose. The end that joins to the lower part of the cap or helmet is made like the mouth of a bag. The operator draws it on whole, and then the upper part, or mouth, is tied close around the lower edge of the cap. Weights of lead are attached to the feet, of ten pounds each. From the top of the helmet there is a pipe as long as, or longer than, the water is deep, which the operator is going to work in, attached to an air pump. This is the air refreshing, or supply pipe; another pipe, from the helmet to the top of the water, is the discharge pipe. In the latter, there is a flat portion, about 6 inches long, made by stitching two flat pieces of sole leather together on the edges, situated about 6 inches from the helmet, and this constitutes the safety valve. On this valve, the pressure of the water acts so as to prevent the escape of air from the dress, till the air, surrounding the body from the fingers to the toes, is more dense than the water, then a proper portion of the air escapes through the valve, and goes up to the surface, along the discharge tube.

Boston and Lynn India Rubber Company, 1st premium for India Rubber Goods—a silver medal. C. C. Nichols, 33 Fulton street, agent.

Also, from the India Rubber Factory, Roxbury, Mass. (warranted water and air tight)—

Ladies' India Rubber Camlet Cloaks; Gentlemen's Drab Pantaloons and Surtouts; Life Preservers; Silk Air Cushion; Ladies' Prunelle Shoes—a diploma. H. A. Winslow, 66 Maiden lane, agent.

Carriages, &c.

Isaac Mix & Sons, a very handsome Stanhope, with improvements in manner of putting on tires, worthy of particular notice; the rundle behind is well arranged for servant, or can be closed at pleasure—a silver medal.

Isaac Mix and Sons, one carriage, turn-over seat Stanhope, a well made and convenient article for a family. A diploma.

I. Cooke & Sons, one double seat Phæton. This carriage is so constructed that it can be used as a barouche, with a top to close all round, or as a double seat Phæton; by taking off the driver's seat and turning the front seat to face the horses, the top can be thrown down or removed at pleasure. A silver medal.

I. Cooke & Sons, a very handsome Buggy Waggon—a diploma.

Peter L. Donaldson, Newark, N. J., for Gig Axles—a diploma.

Gold, Silver, Plate, Jewelry, &c.

Mullen & Ackerman, for specimens of filagree jewelry—a diploma. W. J. Mullen, of the same firm, has been awarded a medal for two gold watch dials. Mr. M. deserves great credit for the perfection to which he has brought the American manufacture of this article. He was the first in this country to attempt their preparation, and now executes them in a style equal to any that can be imported.

James Thompson, 2d premium for Silver Pitchers—a silver medal.

Richards, 1st premium on Patent Spring Gold Spectacles—a diploma.

Robinson, Jones & Co., 1st premium for plain and fine gilt chased and fancy buttons—a silver medal. Attwater, Parker & Wilson, No. 8 Platt street, agents.

Ackerman's Lithometallic, or Jewel-pointed Pen, is a gold pen, with points made of a valuable jewel, and one of its peculiar advantages is that it cannot be corroded by ink, and may be used a long time without being at all injured or impaired by use.

After a little experience, a good writer will prefer it to the steel pen, as the ink flows more freely, and his hand-writing will be uniformly the same, and resemble more that of the quill pen. It is made portable for the pocket, and will be found, to persons travelling, a very useful and convenient article.

We defer (at the request of Mr. Williamson, the inventor,) giving a description of the newly invented graduating silver steel pen, which received the premium of a gold medal.

Marquand & Co., 1st premium for Silver Pitchers, Spoons, and Forks—a silver medal.

Jared L. Moore, for fine specimen of Gold and Silver Spectacles.

Leather, Boots, Shoes, &c.

Sherill & Reed, Salisbury Centre, Herkimer county, 1st premium for hemlock tanned Sole Leather—a diploma. Thomas Brooks & Sons, agents, No. 60 Vesey street.

Quackenboss, Wynkoop & Co., 2d premium for hemlock tanned Sole Leather—a diploma.

W. Leek, 1st premium for oak tanned Sole Leather—a diploma. Isaac Bullard, agent.

F. K. Boughton, Utica, 1st premium for Otter and Seal Skin Caps—a diploma. For sale at 168 Water street.

J. W. Brodie, 1st premium for dressed Otter Skins—a diploma.

J. D. Williams, 1st premium on dressed Muskrat Skins—a diploma.

T. Lane & Son, 1st premium for Ladies' Boot and Dress Slippers—a diploma.

Alexander Clark, 1st premium on Gentlemen's Calf Skin Boots—a diploma.

J. G. Vandenburg, 33 Wall street, fine specimen of water proof Gum Elastic Boots—a diploma.

S. C. Smith, fine specimen of lined India Rubber Shoes—a diploma.

Cloths, Cassimeres, &c.

Denny Manufacturing Company, Oxford, Mass., 1st premium for superfine black and blue Cloths—a gold medal. Steele, Wolcott & Co., 62 Pine street, agents.

Middlesex Company, Lowell, Mass., 2d premium for superfine black Cloth—a silver medal. Steele, Wolcott & Co. 62 Pine st., agents.

Wethered & Brothers, Baltimore, 2d premium for superfine blue Cloths—a diploma. Steele, Wolcott & Co., 62 Pine street, agents.

Daniel Buck, Lawville, Lewis county, N. Y., 1st premium for American Saxony Wool—a diploma. Steele, Wolcott & Co., 62 Pine st., agents.

Wethered & Brothers, Baltimore, 1st premium for black Cassimeres—a silver medal. Steele, Wolcott & Co., Pine street, agents.

Middlesex Company, Lowell, Mass., 2d premium for black Cassimeres—a diploma. Steele, Wolcott & Co., 62 Pine street, agents.

Dick & Sanford, Newtown, Conn., 1st premium for Satinets—a diploma. Charles N. Mills, 44 Pine street, agent.

John Wilde & Co., Bloomfield, N. J., 1st premium for White Flannels—a silver medal. J. Wilde, No. 12 Gold street, New-York.

A. Robinson, Fall River, Mass., 1st premium for Prints—a gold medal. Brown, Brothers & Co., 63 Pine street, agents.

Louisdale Company, R. I., 1st premium for Nankeens—a diploma. Lawrence & Trimble, 51 Pine street, agents.

Paul M. P. Durando, 1st premium for Boys' Clothing—a diploma.

Horne, Shepard & Fisher, a piece of Bleached Cotton Flannel—a diploma. L. Holbrook & Co., 53 Pine street, agents.

Premiums or diplomas were also awarded for the following:

Wm. T. Willard, for Covering for Vault Grate—a diploma.

John Woolley, 1st premium for Roofing—a diploma.

E. B. Sweet, 2d premium for Roofing—a diploma.

Peck & Lanmuier, 1st premium for Beaver Hats—a diploma.

A. & A. Bancker, 2d premium for Beaver Hats—a diploma.

J. M. Henderson, 1st premium for Silk Hats—a diploma.

Hyatt & Smith, 1st premium for Sign Painting—a diploma.

John M. Brown, 2d premium for Ornamental Sign Painting—a diploma.

J. F. Hanks, 1st premium for Ornamental Sign Painting—a diploma.

Judah A. Lee, 1st premium for Plain and Ornamental Penmanship—a diploma.

S. Andrews & Co., Perth Amboy, 1st premium for Combination Lock, invented by S. Andrews—a silver medal.

J. G. Pierson & Brothers, 1st premium for Wood Screws—a diploma.

T. & B. Rowland, Philadelphia, 1st premium for Mill Cross-Cut and Pit Saws and Shovels and Spades—a silver medal. Edward Field, No. 1 Platt street, agent.

Lewis McKee & Co., Plymouth, Conn., 1st premium for Chest and Cabinet Locks—a diploma. Atwell, Baker & Wilson, agents, No. 3 Platt st.

W. Hunt & Co., Douglass, Mass., 1st premium for Axes and Hatchets—a diploma. Agents, Hubbard and Casey, No. 48 Exchange Place.

Johnson & Co., 1st premium for Cosmetics, Fancy Soap and Perfumery—a diploma.

O. S. Williams, 1st premium for Travelling Trunk—a diploma.

R. R. Chamber, 2d premium for Travelling Trunk—a diploma.

R. H. Oldson, 1st premium for Hobby Horse—a diploma.

New England Crown Glass Company, first

premium for Boston Crown Glass—a diploma. Charles Goff, 164 Maiden lane, agent.

B. Bosch, 1st premium for Secretary Book Case & Standing Mirror—a silver medal. Joseph Titcomb, 196 Broadway, agent.

Lowell Company, Lowell, Mass., 1st premium for Hearth Rugs—a silver medal. Stone, Swan & Mason, Pine street, agents.

Powers & Co., Lansingburgh, 1st premium for Oil Cloth—a diploma. T. L. Chester & Co., agents, Broadway.

Charles Attwood, Middletown, Conn., 1st premium for Metallic Pens—a diploma.

A. Denslow, Hartford, Conn., 1st premium for Card Wire, manufactured at the Rainbow Mills—a diploma. John Whittemore, 66 Frankfort street, agent.

William Field, for Vertical Trip Hammers—a diploma.

J. C. Stevens, for a model of a Fire Engine—a diploma.

Bollen, Pollard & Co., Hartford, Conn., for specimens of Box Wood and Ivory Rules—a diploma. Pettibone & Long, No. 4 Liberty street, agents.

Mr. Thompson, 1st premium for Paste Blacking—a diploma.

Wm. Sturdevant, 1st premium for purified Sperm Oil—a diploma.

W. Woolley, first and second premiums for two Surgical Bedsteads—a gold medal. For a full account of this valuable invention see p. 74, vol. iv., of this Magazine.

Dr. Leo Wolfe, third premium on surgical bedsteads—a diploma.

R. & E. Orrell, Providence, R. I., first premium on Weavers' Reeds—a silver medal.

Blake & Brothers, New-Haven, first premium on Escutcheon Latches—a diploma.

N. Hooper & Co., Boston, first premium on Mantel and Astral Lamps—a silver medal. John Nye & Co., 30 South street, agents.

C. Cornelius and Sons, Philadelphia, second premium on Mantel Lamps—a diploma. P. N. Haughwout & Son, 609 Broadway, agents.

M. Lefoulon, fine specimens of Stone Ware—a diploma.

L. Decasse, fine specimens of Fire Brick and Pipes, for conducting water, manufactured at the Salamander Works—a diploma.

Lowell Company, Lowell, Mass., fine specimen of Venetian Stair Carpeting—a diploma. Stone, Swan & Mason, Pine street, agents.

Norwalk Felt Co., Norwalk, for Felt Carpeting and Rugs—a diploma.

P. Luff & Co., fine specimen of Portable Writing Desk and Dressing Case—a diploma.

William Fulcher, splendid inlaid Centre Table, made of American wood—a silver medal.

R. J. Brown, an elegant Marble Centre Table—a silver medal.

Underhill & Ferris, a beautiful Cararra Marble Fireplace—a silver medal.

R. Heinish, Patent Tailors' Shears—a silver medal. J. Andrews, 147 Fulton street, agent.

T. Thomas, for Painting on Glass—a diploma.

Isaac F. Bragg, fine specimen of Penmanship, sent in for exhibition only—a diploma.

A. Macklin, fine specimen of Embossing from Brass Cylinders—a silver medal.

D. Berrien & Co., for superior Smith Bellows, Fancy Brushes and Bellows—a diploma.

E. & J. Fairbanks, a Concentrated Platform Scale—a diploma.

J. M. D. & T. W. Keating, 3 small models of Steam Engine—a silver medal.

G. Hodges, Andover, Mass., for Flannel made in imitation of Welch—a diploma. Stone, Swan & Mason, agents, Pine street.

J. B. Cheeseman, fine specimen of Pasteboard—a diploma.

Thomas Godwin, fine specimen of Gilding on Glass—a diploma.

F. A. Kipp, & C. Cordes, fine specimen of Starch—a diploma.

Henry Keep, 2 fine specimens of Fancy Tuscan Bonnets—a diploma.

Esther R. Cobb, Wrentham, Mass., a very fine specimen of a Lady's Hat, made of rye straw—a silver medal.

A & S. White, a very handsome specimen of Tuscan Hats, made of foreign materials—a diploma.

Mrs. S. Little, a splendid Feather Bonnet, made of Poll Parrot Feathers—a silver medal.

Sebastian Jaclard, for Wigs, Toupees, &c.—a diploma.

Samuel Judd, for specimen of Spermaceti Candles—a diploma.

J. A. Riell, for specimen of Macaboy Snuff—a diploma.

Miss Mason, for specimen of Bead Bag—a diploma.

Miss Clark, several elegant specimens of Worsted Flower, and other ornamental worsted work, together with some handsome specimens of Drawing—a diploma.

Miss L. A. Browere, fine specimen of Wax Fruit and Flowers, and a pair of Transparent Blinds—a diploma.

Miss B. Van Tuyl, a specimen of Gilding on Velvet, and a Landscape Painting in oil—a diploma.

Miss Lucretia Fordham, Brooklyn, aged 14 years, a pupil of the Mechanics' School, a specimen of Worsted Embroidery—a diploma.

W. Williams, a pair of Worsted Lamp Mats—a diploma.

Miss Ann Eliza Constantine, aged 12 years, a pupil of the Mechanics' School, a piece of Shell Embossed Work—a silver medal.

Japanned Ware, exhibited by J. Smith & Son, Nos. 217 Water and 244 Grand streets, to show that Japanning can be and is brought to as great perfection in this country as in the old; and secondly, that the said persons do manufacture japanned goods to compete with the imported; and, thirdly, that old goods which have been in use for many years, so that the japan is almost, or altogether, worn off, can be, by them, (and they are the first that have done it in this city,) be made equal to new. 2d premium—a diploma.

T. Ternan & Co., 1st premium on Japan Ware—a diploma.

F. Reynolds, specimens of Plain Needle Work—a diploma.

Miss Mallison, fine specimen of Wax Flowers,—silver medal.

Miss Sarah Maria Street, New-Haven, aged 13 years, one Chair Seat, an elegant specimen of embroidered Canvas—a diploma.

Mrs. Cooke, of New-Jersey, two Shell Boxes, one pair Shell Vases, and one Shell Watch Stand—a diploma.

Miss Thompson, two vases, fine specimen of Wax Flowers—a diploma.

Miss Margaret Fanshaw, a Bed Quilt, containing 16,800 pieces—a diploma.

Mrs. W. R. Addington, a Shell Wreath and Box—a diploma.

Mrs. Baldwin, a Shell Basket—a diploma.

Lorinda Lydaback, a fine specimen of Blue Silk Vest—a diploma.

Robert Ward, fine specimen of Carving, Butcher, and Cook's Knives—a diploma. J. Andrews, 147 Fulton street, agent.

J. Russell & Co., Greenfield, Mass., fine specimen of Socket Chisels—a diploma. Edward Field, No. 1 Platt street, agent.

Edwin Ellis, Attleborough, Mass., Brass Butt Hinges—a diploma. Atwater, Baker & Wilson, No. 8 Platt street.

D. E. Delavan, fine specimens of brass Stair Rods, brass and copper Coal Hods, brass Tea Kettle and Stand—a silver medal.

Wm. Morgan, an ingenious Pocket Pistol—a diploma.

F. W. Widman, Philadelphia, case of splendid Swords—a silver medal.

Timothy Dwight & Son, New-Haven, specimen of Screw Augers—a diploma. Ibbotson Brothers, 242 Pearl street, agents.

Ewin & Heartte, Baltimore, for excellent specimen of Leveling Instruments, and improved Leveling Instrument and a Theodolite Compass—a silver medal.

Wm. J. Young, Philadelphia, for excellent specimen of Railroad Goinometer, an improved Compass, and a Level Goinometer—a silver medal.

John Roach, a fine Barometer, Thermometer, and Hydrometer, in one vertical column case—a silver medal.

Henry Cooke, for a Drill Breast-plate, with a Swivel—a diploma.

U. S. West, for a Bottle Faucet, for tapping a bottle without drawing the cork—a diploma.

N. J. Williams, for Weavers' Shuttles and Reeds—a diploma.

Jeremiah Dodge & Son, fine specimen of Wood Carving, two Stancheons for a Fire Engine—a silver medal.

Wm. E. Stoutenburgh, for a four-light Suspended Lamp and twelve-light Chandelier—a silver medal.

E. S. Scripsure, a centripetal Power Press—a diploma.

O. Parker, for Hydraulic Cement for making durable Cisterns and large Stone Vessels—a gold medal.

Eaton & Gilbert, Troy, a very fine Omnibus—a diploma.

E. & S. S. Rockwell, Patent Vault Light—a silver medal. [See page 91.]

Fredericks & Smith, for a splendid French Chair—a silver medal.

Robert Usher, two fine specimens of Spiced Beef—a diploma.

Delano & Sons, good specimen of Iron Chests—a diploma.

W. B. Green, good specimen of Iron Chests—a diploma.

F. Fossard, for a piece of La Fayette Blue Cloth, a dye substituted for Indigo—a diploma.

Aaron Gilbert, New-Lebanon, one box of Shakers' Herbs—a diploma. Rushton & Aspinwall, 86 William street, agents.

Mrs. Jessie E. Paul, for fine specimen of Cotton Fruit—a diploma.

Miss A. Lewis, for a piece of Embroidery on Canvas—a diploma.

Samuel Allen, one bale of Hemp, raised at Copenhagen, N. Y.—a diploma. Peter Remsen & Co., No. 109 Pearl street, agents.

S. N. Brewer & Brothers, Boston, for specimen of Lozenges. D. & E. L. Perkins, No. 9 Courtland st., agents.

Robert G. Lamphier, Washington city, D. C., for a fine specimen of Seal Engraving—a diploma.

Mr. Charles G. Christman, improved twelve keyed Flute, manufactured at 398 Pearl street, New-York.

The Rev. William Fisher, Meredith, Delaware county, N. Y., specimen of refined Maple Sugar—a diploma.

Refined Sugar, exhibited by H. & J. Stuart—a diploma. Without exception the most excellent and finest sugar that ever came under our notice. We recommend to all house-keepers to examine it for themselves, and we are satisfied it needs no other recommendation. Ladies particularly, will find it a valuable appendage to the tea table, as well as for other domestic purposes.

Madam Doyley, fine workmanship one pair Corsets—a diploma.

Specimen of a Straw Hat, from the manufactory of J. D. Cobb, Wrentham, Mass. The fabric is rye straw, of Wrentham growth, braided by Miss Adeline Pond, and sewed by Mrs. Esther R. Cobb. Its fineness cannot be surpassed. It is a beautiful specimen of American enterprize and industry.

Fancy Glass Working, Blowing and Spinning, by W. J. Hanington, of the American Museum and 450 Broadway.

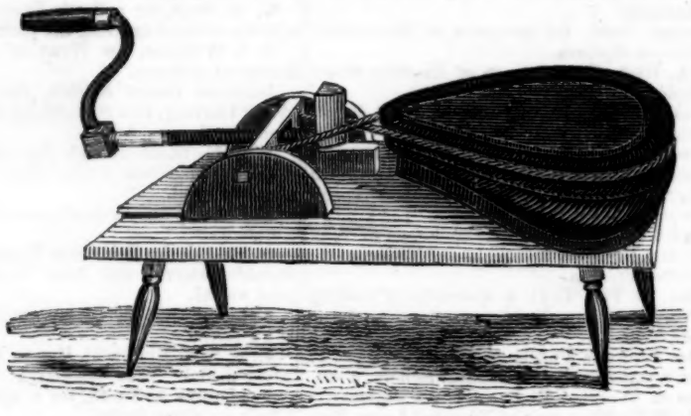
Birds and animals were made to resemble life; also pans, globe vases, decanters, segar tubes, pipes, glass plumes, and various other articles, formed at the blow-pipe of the glass while in a state of fusion, in the presence of the company. The process of glass blowing in all its varieties, at intervals blown finer than leaf gold, when it bursts with the report of a pistol, forming a shower of glass, frosting, tinted with all the various prismatic colors; glass spin-

ning, on a wheel of multiplying power; by this process red hot glass was spun at the rate of 1000 yards a minute; specimens of ribbons were shown, manufactured from this material; glass balloons, in jars, made repeated ascensions; pulse and spirit glasses, together with philosopher's or water hammer.

H. J. S. Hall, best specimen of Fire-Works—a diploma.

Nathan Post's Patent Hame Collar Blocks, manufactured and sold by Francis S. Lane, No. 279 Bleecker street, New-York.

These patent blocks and rights may be had at the place above mentioned, or at the store of

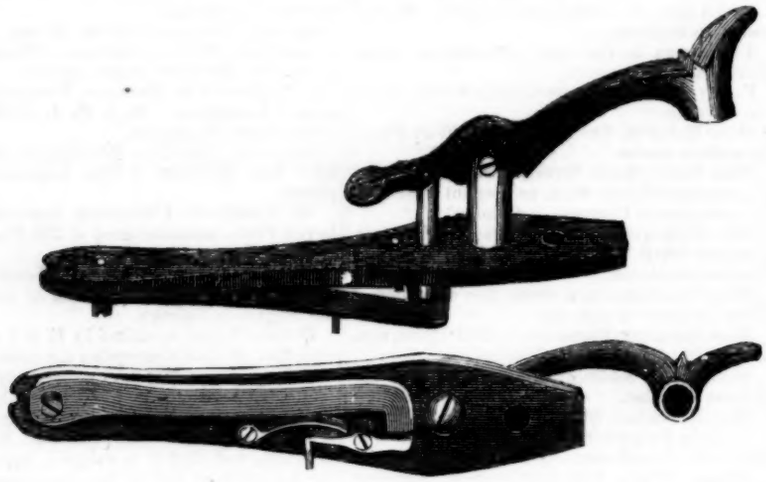


Henry Storms, No. 179 Water street, corner of Burling slip, where one may be seen constantly in use. The proprietor of this invention takes pride in offering it to the trade as one of the most important discoveries in crimping and perfecting the hame collar, both with regard to saving labor and producing accuracy of form, that has ever been the subject of a patent.

"I hereby certify that I have used one of the above mentioned blocks for shaping hame collars, and find it to be a great labor saving machine, which overcomes the great difficulty heretofore experienced in making collars, both for the ease of the horse and a sufficient bed for the hame, and I do not hesitate to say that it is particularly worthy the notice of manufacturers. HENRY STORMS, Saddler."

[The above is doubtless important, particularly when we consider the pain and injury inflicted on horses from the use of ill-shaped hames.]

We have seen a Gun Lock,* invented by a sporting gentleman of Virginia, with which we



are much pleased, and, if we are not mistaken, it will supersede the percussion lock now in use. It is styled the "Lateral Percussion Lock," and differs from the lock now in use in having a hammer that plays lateral to and parallel with the barrel on the tube, which is introduced precisely where the touch-hole of a flint gun is usually placed. The interior construction is remarkably plain, not half so complex as the common lock. By the lateral hammer, the upright cock of the flint and the hammer of the percussion gun is entirely done away with: consequently, the top or upper surface of the barrel presents a smooth and perfectly even appearance. Sight in the flying shot is much more accurately taken by this means, in consequence of the absence of the elevated cock. The facility with which the flint gun can be altered to the percussion is another very great advantage arising from this improvement. The gentleman has promised us a more particular description of the lock, which will be hereafter inserted. [See engravings above.]

* These were intended to be exhibited at the Fair, but arrived in New-York too late.

Ne-plus-ultra, or Mississippi Life Boat, invented by Daniel M. Toll, M. D. of Schenectady. The object and use of the boat being determined upon, ought to govern its dimensions; the hull of one boat is to be constructed of the requisite dimensions, that is to say, of proper width, length, and depth, whose sides, between the curve where the bow commences and the curve where the stern commences, are to be a perfect longitudinal parallelism; her sides, in a vertical direction, are to observe a curvilineal line—they are to be, in other words, a perfect arc of a circle. A cross section of the hull is to be a circular zone, the longest cord of which is to be the transverse line of her deck, and the shortest cord to be the transverse line of her bottom; her bow and stern are to be shaped and modeled in such a manner as will give her, when in motion, the greatest possible relief from positive and negative pressure. Her deck and bottom are to be pierced or perforated with a series of openings, in a lineal direction from bow to stern, of a magnitude in her deck to receive the largest circumference of a hollow sphere or globe, and in her bottom of such diminished dimensions as to receive only a segment of the same globe or hollow sphere. Bulkheads are to be constructed perfectly water tight within her hull, that is, between her deck and bottom, and to join close all around upon the margin of the perforation which is in the bottom of the boat or hull, and carried up and joined close on and all around the margin of the perforation in the deck: this bulkhead is to be shaped as to assume a globular form, and to encompass and give facility for a globe to revolve, which is to be suspended in its chamber: the residue of the perforations and chambers, for the reception of the globes, are to be finished in the same manner: the residue of the whole remaining part of the boat or hull is to be divided off into compartments by perfect water-tight bulkheads: next, a requisite number of hollow globes or spheres are to be made, and of a proper magnitude, mounted with iron axletrees through their axis, and the ends sufficiently projecting to answer for gudgeons; these globes, so mounted with their axletrees, and perfectly water tight, are to be suspended in the above mentioned chambers, fastened and secured in sockets or boxes in a workman-like manner, and with a segment of the globes projecting through the orifice in the bottom of the boat or hull, so that the globes may revolve with facility, to enable them to carry the boat over the shoal or bar with facility; this one boat or hull, now considered finished, another, of the same dimensions, and built every way in the same manner, is to placed by her side and parallel with her, and at a proper distance: these two twin boats are to be connected with suitable cross-beams and timbers, supported a sufficient height above deck with stancheons, and the whole well secured with proper braces and fastenings in a workman-like manner, the whole of which will constitute the float or bottom of my boat.

The above described boat is intended should be built either of iron or of wood, or of iron and wood combined, or of any other material; she is intended to be used for passage or freight, or any other use that any other boat is used for, and she is intended to be moved by any tractile or motive power. And further—on the above float or bottom of my boat, a superstructure is to be erected, as fancy or necessity may direct or dictate. And again, it is the intention of the inventor, that the stern of each of the twin boats should be carried back the requisite length, in imitation (or nearly so) of an eel's tail, so as to give her run a clean, smooth exit, with the least possible distress from negative pressure when in motion; her bows are to be carried forward so as to assume the most elegant tapering form, thereby enabling her to separate the resisting particles in the most easy manner, to give relief to positive pressure.

The invention and improvements herein contemplated consist in giving additional security to my water wheel, by being placed between the twin boats, and by obtaining buoyancy and speed, and likewise by giving facility to the crossing of shoals or bars in shallow water by the rolling and revolving of the globes on their axles, and likewise by securing and retaining the buoyancy of the whole of the uninjured part of my boat as a compensation for the loss of that part which might be pierced or penetrated by the impetus of a snag or any other substance.

The objections that may be raised or suggested to her speed, in consequence of the projections of her globes through her bottom, will yield on the least reflection, for as soon as the resistance amounts to the sum of the friction on the axletrees, the globes will revolve and thereby relieve the resistance.

And again—the apprehension that may be had on the score of resistance from the small and slender sheets of water that will be standing around the globes in the chambers, will as readily vanish by reflecting that the cohesion of water is merely nominal.

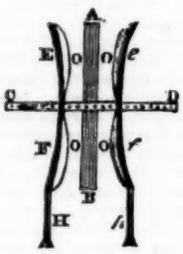
Observations.—This boat may be built and used without either globes or compartments, where there is plenty of water and no danger of having her hulls pierced or perforated. Again, she may be used with or without her globes, with or without her compartments, or any other way, as the case may require.

Application of the Principle of a Balance.

[From the American Journal of Science and Arts.]

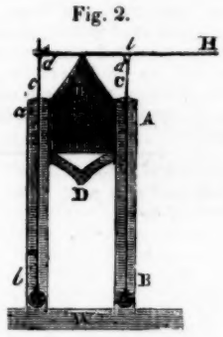
The principle of a balance is a powerful one when ingeniously and judiciously applied to mechanics and the arts. Its applicability is universal. There are few if any machines now in operation that are not dependent upon this principle, or to which it cannot be beneficially applied. Look at the numerous machines employed in the various manufactories of Europe and America: how diversified, how multiplied, and how complex their operations; what a consumption of power is required to work or move them; what expense is incurred, and how great is their performance; nevertheless, how few are the parts, and simple the motions, absolutely necessary to answer, if not overrun this performance. Indeed, what cannot man do on the principle of a balance, and what can he do without it. With it, with liberty to exert his power, he might displace the world; and without it, how limited would be his influence in mechanics and the arts, and how small his accessions of power and profit derived from that source. I conclude my premises (as effects balance causes, and causes effects,) by suggesting that some of the greatest discoveries yet to be developed to the world may, in all probability, be founded on the powerful and universal principle of a balance, which pervades not only mechanics and arts, but every part of the universe.

Fig. 1.



1. Application to Milking.—Fig. 1 represents a machine for milking. A B represent a light block, five inches long, three wide, and an inch and a half thick. C D represent a ruler-like piece of wood, or metal, five inches long, one third of an inch thick, and two thirds wide, perforated with holes at every sixth of an inch from end to end. This piece, C D, is to be firmly inserted, and fastened at right angles in the middle of the block A B. E F, *e f*, represent two similar, strong, light, thin boards, a little curved from their centre, each five inches long, three wide, and half or two thirds of an inch thick. H *h* represent the handles, which can be formed in connection with the boards, or attached separate. The boards are to have each one mortise, cut through its middle, of a sufficient size for the easy and regular motion of the ruler-like piece C D. Holes are to be made at right angles through the centre of each of these mortises, corresponding with those in the piece C D, so that by means of small pins or screws, these boards, E F, *e f*, can be moveably hung nearer or farther from the block A B, as required. o o o o, represent the spaces between the block A B, and boards E F, *e f*, which the teats are to occupy to be milked. The sides of the block A B, and the inner sides of the boards E F, *e f*, are to be lined with leather, or some other soft substance, stuffed with cotton, &c. so as to be elastic and press easy against the teats and not injure them. This lining should be harder, and project farther, the nearer it comes to the upper sides of these boards and blocks; so that when the pressure is given, it will commence at the upper parts of the teats and gradually increase downwards, till all the milk is forced out. Instead of this stuffed lining, springs, spiral wires, or some other elastic substance, may be used; perhaps springs are best. To work this machine, it is to be supported by the hands by means of the handles H *h*, in such a position that the teats will hang down between the block and the boards at o o o o, two teats each side of the piece C D. Both handles are to be moved inwards and then outwards, either fast or slow, so that the operation of milking can be performed or regulated at pleasure. When the handles are moved inwards, the two nearest teats to the milker will be milked; when moved outwards, the two farthest; and thus, as the motions can be so quick, there will almost flow four streams, till the operation is performed. Instead of communicating the pressure on the outside, it may be applied on the inside by altering the construction a little. This machine is applicable to other purposes allied to the operation of milking. The construction, dimensions, weight, and quality of the materials are variable, but the principle of operation is the same.*

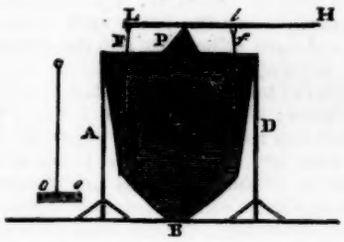
Fig. 2.



2. Application to Pumping.—Fig. 2 represents a balance suction or forcing pump, for water or air, wherein there is no loss of motion. W represents a body of air or water. A B, *a b*, represent two similar hollow cylinders, whose lower ends are inserted perpendicularly, equidistant, and parallel in the body W of air or water. P represents a pivot, which firmly connects the top of the cylinders, and across which the balancing lever L *l* is to be moveably hung and poised. H represents the handle of the lever L *l*. C *c* represent two similar piston rods, whose upper ends are moveably hung to the lever at *d d*, and to whose lower ends are attached either pistons or valves, as it is designed for a suction or forcing pump. D represents the pipes of both cylinders, united to convey off the air or water. It can be conveyed off separately. This is operated by an upward and downward motion of the handle H. Any equal number of pumps, either suction or forcing, of equal dimensions, can, by being connected on this principle of a balance, be worked or moved by one handle. This application is susceptible of numerous modifications.

3. Application to Churning.—Fig. 2 will serve to illustrate its application to churning. A, B, *a b*, represent two churns; C *c*, their dashers or piston-rods; L *l*, the balancing lever; H, its handle; P, its pivot, which connects them the same as the cylinder A B, *a b*. It is worked by an upward and downward motion of the handle H. This construction may be modified into a forcing or piston churn, by having a communication at the bottom between them, to force the cream alternately from one into the other. Instead of two churns, one churn resembling those commonly wrought by a crank, with a piston through the middle, and an aperture through that, would answer the purpose. I am of the opinion, that, in churning, the cream would gather sooner, and form butter, by being powerfully forced alternately through small apertures, than by any other means, unless it be by adding some substance or composition that will immediately fetch it. Instead of the cream's being forced from one churn into the other and backwards, constantly, a small wheel full of holes, (the lids of the churns being made tight and fast,) might be attached to the lower end of each piston-rod or dasher, and made to operate up and down, and answer the same purpose, or a better than the former method.

Fig. 3.



4. Application to Washing.—Fig. 3 represents a washing machine. C represents the cistern, which can be lined with rollers on the two sides A D, to hold the water and the clothes to be washed; three feet high and three wide; A B D, its frame; P, the pivot; L *l*, the balance lever; H, its handle; F *f*, the rods on which the washers, beaters, or rollers, are hung; *o o* represent a beater, &c. attached to its rod F or *f*. This machine is operated by the upward and downward motion of the handle H, and can be variously modified.

5. Application to Fulling.—Fig. 3 will serve to illustrate its application to a fulling-mill or machine. There are two constructions to this application: a vertical and horizontal. Fig. 3 enlarged will represent the

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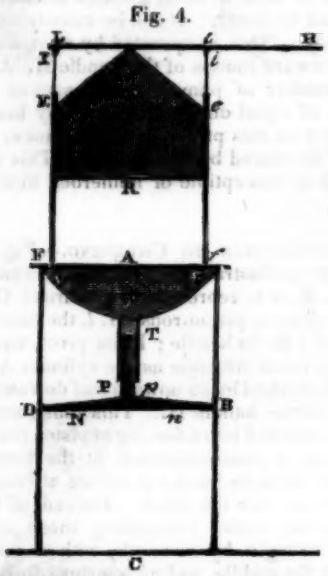
* Having stated to the author some doubts as to this new process of milking, we have received his assurance that he has proved it practically, and that he desires its publication.—[Ed.]

vertical one. The horizontal one is nearly the same as the vertical, only that the lever and rods have a horizontal motion, and the cistern must be modified a little to answer it. In both constructions the operating power is to be applied to the handle H.

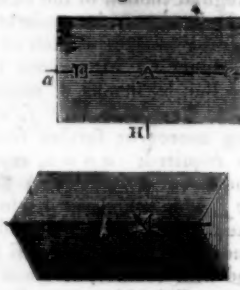
Fig. 4.



6. APPLICATION TO AN AEROSTATIC OR HYDROSTATIC PRESS.—Fig. 4 represents an aerostatic or air, or a hydrostatic or water press; A B C D, its frame; W, the air or water cistern, which in shape resembles the segment of a hollow sphere or hemisphere; T, a strong hollow cylinder inserted in or attached to the bottom of the cistern; N *n*, the follower, a strong bar, fitted to move up and down in the sides D B of the frame. To this follower is attached the piston P *p*, which is exactly fitted to move up and down in the cylinder T, so as to prevent the escape of air or water. The pressure of this press is given between the follower N *n*, and the side of the frame C. E F, *e f*, represent two hollow pipes, whose lower ends are tightly inserted into the cistern W. V *v*, two valves that exactly cover the lower ends of these pipes, and open sufficiently into the cistern. R, the pivot of the operating lever, which connects the top of the pipes; L *l*, the operating lever; H, its handle; I *i*, two rods that move up and down in the pipes, whose upper ends are moveably hung to the lever L *l*, and to whose lower ends are attached wheels or pistons with valves in their centre, opening downwards, exactly fitted to move up and down, and not allow the escape of air or water. To give the pressure either by air or water, it is admitted into the top of the pipes, passes through the valves in the wheels and the valves V *v*, until the cistern is full; the handle H is then to be worked, and the water or air will force down the piston P *p*, and consequently the follower N *n*, and press whatever is between it and C. To take off the pressure, the air or water can be let out of the cistern. Pistons might be used in the pipes. This press is susceptible of numerous modifications and applications.

7. APPLICATION TO PRINTING.—Fig. 5 represents a printing machine. A represents an oblong table or frame, set full of types, and balanced on its axle E *e*, which supports it at *a a*, moveably in two upright standards.

Fig. 5.



H represents the operating handle; M, a heavy or solid, oblong, triangular block, as wide and long as the table, over which it is to be firmly hung, so that one of its angles will run parallel and laterally with its axle E *e*. The two sides of the block M, immediately over the types or against which they will press, when the handle H is operated, must be lined with some elastic substance, in order to give a good impression. The types are to be inked by inking rollers, and the paper applied by hand or machinery. Instead of the table being moveably hung, and the block fixed, it may be reversed: the table fixed and block moveably hung. Instead of the block being triangular, and table flat, the block may be flat, and the table triangular. Every motion of the handle H, either upwards or downwards, will give an impression.

H. STRAIT.

East Nassau, Rensselaer co., N. Y., April 28, 1834.

WEEDS AND LOOSE STONES IN HIGHWAYS.—Very few of our readers, we presume, know that the following is in the Revised Statutes of this State.

"It shall be the duty of overseers of highways in each town, to cause the Noxious Weeds, on each side of the highway within their respective district, to be cut down or destroyed twice in each year,—once before the first day of July, and again before the first day of September; and the requisite labor shall be considerd highway work.

"It shall be the further duty of the overseers of highways, once in every month from the first of April until the first day of December, to cause all the Loose Stones lying on the beaten track of every road within their respective districts to be removed; and to cause the monuments erected, or to be erected, as the boundaries of highways, to be kept up and renewed, so that the extent of such roads may be publicly known."

MEMS. FOR WINE-DRINKERS.

(From Busby's Journal of a visit to the principal vineyards of Spain and France.)

MANUFACTURE OF CLARET.—The finest Clarets of Bourdeaux are mixed with a portion of the finest red wine of Hermitage, and four-fifths of the quantity of the latter which is produced are thus employed. The wine is racked off the lees in spring, and sulphured. A very small piece of sulphured match is burnt in the casks intended for the white wine; the red wine requires a greater portion. These matches are purchased from persons who make a business in preparing them. They are slips of paper, about one inch and a half broad, and, when coated on both sides with sulphur, are about the the thickness of a sixpence. A piece of one inch and a half square is sufficient for a cask of white wine containing fifty gallons.

DESCRIPTION OF THE CELEBRATED HERMITAGE VINEYARDS.—The hill of Hermitage is so called from an ancient hermitage, the ruins of which are still in existence near its top. It was inhabited by hermits till within the last 100 years. The hill, though of considerable height, is not of great extent; the whole front which looks to the south may contain 300 acres, but of this, though the whole is under vines, the lower part is too rich to yield those of the best quality, and a part near the top is too cold to bring its produce to perfect maturity. Even of the middle region the whole extent does not produce the finest wines. M. Machon, the gentleman whose property we were traversing, pointed out to me the direction in which a belt of calcareous soil crossed the ordinary granitic soil of the mountain, and he said it requires the grapes of these different soils to be mixed in order to produce the finest quality of Hermitage. I took home a portion of the soil which he pointed out as calcareous, and the degree of effervescence which took place on my pouring vinegar upon it indicated the presence of a considerable portion of lime. It is probably to this peculiarity that the wine of Hermitage owes its superiority, for, to all appearance, many of the neighboring hills on both sides of the Rhone present situations equally favorable, although the wine produced even upon the best of them never rises to above half the value of the former, and in general not to the fourth of their value. A good deal may also be attributable to the selection of plants. The best red wines of Hermitage are made exclusively from one variety, and the white wines from two varieties; but in the district generally a much greater number of varieties are cultivated. The Red Grape is named the Cyras. The white varieties are the Rousette Marsan. The former yields by itself a dry and spirituous wine, which easily affects the head; the plant produces indifferently—the latter yields a sweeter wine—they are mixed together to produce the best white Hermitage.

MODE OF PREPARING CHAMPAGNE WINE.—The very eminent wine house of Messrs. Ruinart and Son, of Rheims, are agents for Herries, Farquhar and Co's notes. Having called upon them to cash one of these, M. Ruinart, junr., conducted me over the wine cellars, which are very extensive, and all subterranean, consisting of three under-ground stores, one beneath another, all mined out of the lime stone rock. The wine, which has received the last attention which it requires, and is ready for expediting to the consumer, is packed in large square masses, bottle above bottle, and side by side, with no other precaution to keep them steady than a lath passing along beneath the necks of one layer and the butts of the next layer above. They generally send the wine to the consumer at the age of three and four years, but after the first winter it is all put in bottle. The stock, therefore, appears immense, and indeed it is very large; for not only are different qualities required, but also different descriptions, to suit the varying tastes of their customers in England, America, and Russia, to which countries Messrs. Ruinart make their chief exports. A gentleman, with whom I travelled, told me that he could buy very good sound Champagne at Chalons for two francs a bottle, and was then going to purchase 100 bottles at that price, but respectable wine merchants never send any to England under three francs a bottle. What is sent to England is more spirituous, and froths more strongly than what is sold for domestic consumption. The greatest and most minute attentions are necessary in preparing Champagne. The casks in which it ferments, after running from the press, are previously sulphured to prevent the fermentation from proceeding to too great a length. It is twice clarified during the winter, and in the month of March, before the return of spring has renewed the fermentation, it is bottled off. When in this state, the bottles are placed in frames, diagonally, with their heads downwards. The lees are thus collected in the neck of the bottle, but they do not consider it necessary to uncork the bottles as soon as the wine is perfectly clear, nor is it considered that there is any danger of the wine spoiling, if the return of warm weather should cause a recommencement of the fermentation, and remix the lees through the wine. On the contrary, they sometimes allow the lees to ripen, as they term it, longer than usual. The wine, in general, remains in this state, till the following winter; each bottle is then placed in a frame and carefully uncorked. The contents of the neck of the bottle are emptied. It is filled up from another bottle of the same wine, and, being recorked, only requires age to give it all the perfection it is capable of. It of course often happens, that the wine has either undergone less than the usual fermentation, or, being stronger than usual, requires a greater fermentation before being put into bottles; and it consequently happens that the fermentation in the bottles is greater than they can bear, and that a large proportion of them burst during the first summer. The floors of the wine cellars are all covered with grooves, sloping to a gutter, by which the wine that has burst the bottles is conveyed to a cistern in the floor, and, as there is the most perfect cleanliness observed, a part of the wine is thus sometimes saved.

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